Chapter 1

Ryan Haggerty/USFWS

Northern diamondback terrapin

Introduction and Purpose of and Need For Action

Introduction

Eastern Neck National Wildlife Refuge (refuge, NWR) is a 2,286-acre island in Kent County, Maryland. Established in 1962, its purposes are to provide long-term protection for unique wetlands, threatened or endangered species and migratory birds of conservation concern, and to sustain regionally significant concentrations of wildlife. Forty percent of the refuge consists of brackish tidal[1] marsh and tidal ponds. The remaining 60 percent includes upland forest, cropland, grasslands, shrub/brush, freshwater ponds and moist soil units. Since 2005, it has been managed as part of the Chesapeake Marshlands (CM) National Wildlife Refuge Complex (Refuge Complex); that includes the Blackwater refuge, with its Barren Island, Watts Island, Bishops Head, and Spring Island divisions, and Eastern Neck, Martin and Susquehanna national wildlife refuges (map 1.1).

This draft combines two documents required by federal law.

A comprehensive conservation plan, required by the National Wildlife Refuge System Administration Act of 1996 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Pub. L. 105-57; 111 Stat. 1253; Refuge Improvement Act).

An environmental assessment, required by the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.; 83 Stat. 852; NEPA), as amended.

Chapter 1 explains why we are preparing a Comprehensive Conservation Plan (CCP) and its supporting Environmental Assessment (EA), details the planning process we followed, and sets the stage for the five subsequent EA chapters and six appendixes. Chapter 1:

- Describes the purpose of, and need for, a CCP
- Defines our planning analysis area
- Presents the mission, policies and mandates affecting the development of the plan
- Identifies other conservation plans we used as references
- Clarifies the vision and goals that drive refuge management
- Describes our planning process and its compliance with NEPA regulations
- Identifies and addresses public issues or concerns that surfaced during plan development

Chapter 2, "Description of the Affected Environment," describes the refuge's regional and local setting, physical attributes, habitats and species, and human-created environment of roads, trails, croplands, impoundments, and buildings.

[1] The state of Maryland has jurisdiction for activities in tidal waters below the mean high tide. In this document, when we refer to Service ownership, or describe refuge management actions in tidal waters, we generally mean those areas above mean high tide.

Map 1.1. Eastern Neck Refuge Location in the Chesapeake Marshlands Refuge Complex

Chapter 3, "Alternatives Considered, Including the Service-preferred Alternative" fully evaluates three management alternatives and presents their respective strategies for achieving the refuge's purpose, meeting refuge goals and objectives, and addressing public issues. In the introducing the alternatives, we describe some actions that are "common to all alternatives"; however, most of the chapter details those actions that distinguish the alternatives. Alternative A would continue our present management of the refuge unchanged. Alternative B represents our Service-preferred alternative. It includes the objectives and strategies for wildlife, habitats, and public use that we think best meet the refuge's purpose, vision, and goals. It emphasizes protection and restoration of tidal wetlands and management for wintering waterfowl. Alternative C also emphasizes tidal wetlands protection and restoration, but is distinguished from alternatives A and B by emphasizing contiguous forest habitat management in the refuge's uplands and expanding public use opportunities.

Following public review of this draft CCP/EA, the Regional Director's decision on the management alternatives will result in a final CCP to guide refuge management decisions over the next 15 years. We will also use it to promote understanding and support for refuge management among state agencies in Maryland, our conservation partners, local communities and the public.

Chapter 4, "Environmental Consequences," evaluates the environmental effects of implementing each of the three management alternatives. That is, it predicts their foreseeable benefits and adverse impacts for the socioeconomic, physical, cultural, and biological environments described in chapter 2.

Chapter 5, "Consultation and Coordination with Others," summarizes how the public and our partners were involved in the planning process. Their involvement is vital for the future management of the refuge.

Chapter 6, "List of Preparers," credits this plan's writers and contributors.

Six appendixes provide additional supporting documentation and references:

Appendix A: Species and habitats of conservation concern, and other species lists on the refuge
Appendix B: Findings of Appropriateness and Compatibility Determinations
Appendix C: Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS) lists
Appendix D: Wilderness Review
Appendix E: Staffing Charts by Alternative
Appendix F: Fire Management Program Guidelines

The Purpose of and Need for the Proposed Action

We propose to develop a CCP for the refuge that, in the Service's best professional judgment, best achieves the purposes, goals and vision of the refuge, and contributes to the mission of the National Wildlife Refuge System (Refuge System), adheres to U.S. Fish and Wildlife Service (Service) policies and other mandates; addresses significant issues; and incorporates sound principles of fish and wildlife science.

NEPA regulations require us to evaluate a reasonable range of alternatives, including our preferred action and no action. The no-action alternative can mean either (1) not managing the refuge, or (2) not changing its present management. In this plan, alternative A is the latter. Alternative B is the Service-preferred alternative.

Our purpose in developing a CCP for Eastern Neck refuge is to establish management direction that best meets the following goals:

GOAL 1 **Protect and enhance Service trust resources, and species and habitats of special concern in the Chesapeake Bay region by:**

- Maintaining and restoring the integrity of the refuge shoreline and nearshore environments to sustain Service trust resources and diverse natural communities;
- Managing refuge habitats, as part of a regional partnership, to sustain wintering populations of migratory waterfowl in the lower Chester River basin and contribute to the North American Waterfowl Management Plan population goals for the Chester River and Kent County Bayshore Focus Area;
- Managing for a variety of upland refuge habitats to continue to support the rich diversity of songbirds, raptors, butterflies, and other native habitat;
- Enhancing, through partnerships, the management, protection and monitoring of inter-jurisdictional fish and other aquatic species on the refuge and in surrounding waters; and,
- Protecting and restoring archeological and cultural resources on the refuge.

GOAL 2 **Maintain a healthy and diverse complex of natural community types comprised of native plants and animals to pass on to future generations of Americans by:**

- Protecting, enhancing, and restoring the natural diversity, integrity and health of community types and associated native plants and animals, and sensitive species on the refuge; and,
- Protecting the integrity of federal-designated research and public use natural areas.

GOAL 3 **Conduct effective outreach activities and develop and implement quality wildlife-dependent public use programs, with an emphasis on wildlife observation and photography, to raise public awareness of the refuge and the Refuge System, and promote enjoyment and stewardship of natural resources in the Chesapeake Bay region by:**

- Enhancing and increasing effective public outreach activities to increase the visibility of the Service, the refuge, and the Refuge System and to garner increased appreciation and support for our conservation activities;
- Ensuring that visitors are satisfied with the safety, accessibility, and quality of opportunities to observe and photograph wildlife on the refuge;
- Providing opportunities for quality, recreational fishing and hunting;
- Providing opportunities for environmental education and interpretation that enhance refuge visitor's understanding of the significant natural resources in the Chesapeake Bay area, as well as the important role the refuge plays in its conservation; and
- Providing opportunities for the public to engage in refuge activities through a Friends Group, an organized volunteer program, and through partnerships with individuals, other agencies, universities, and other institutions, there by promoting the mission, management and objectives of the refuge and the Refuge System.

The 1997 Refuge Improvement Act requires us to prepare a CCP for every national wildlife refuge to help fulfill the mission of the Refuge System.

These plans specifically fulfill the need to provide each refuge with strategic management direction for the next 15 years by:

- Stating clearly the desired future conditions for refuge habitat, wildlife, visitor services, staffing, and facilities
- Explaining clearly to state agencies, refuge neighbors, visitors, and partners the reasons for management actions
- Ensuring that refuge management conforms to the policies and goals of the refuge system and legal mandates
- Ensuring that present and future wildlife dependent public uses are compatible with the purposes of the refuge
- Providing long-term continuity and direction in refuge management
- Justifying budget requests for staffing, operating and maintenance funds

There are additional reasons we identify a need to develop a CCP for this refuge. This refuge lacks a master plan to accomplish the actions above in a landscape that has changed considerably since the refuge was established. The economy and land ownership patterns in the region have changed, pressures for public access have continued to grow, and new ecosystem and species conservation plans bearing directly on refuge management have been developed.

Second, we need to evaluate certain facility improvements that include rehabilitating the historic structure that serves as our refuge headquarters and visitor contact facility, realignment and paving of the access road to the headquarters, and paving of the headquarters parking lot.

Third, we have developed strong partnerships vital for our continued success, and we must convey our vision for the refuge to those partners and the public.

Finally, we need a CCP to guide us in conserving Federal trust species in the Eastern Neck area of the Chesapeake Bay (Bay) that is consistent with the vision, goals, and objectives of the CM Refuge Complex CCP (USFWS 2006).

All of those reasons clearly underscore the need for the strategic direction a CCP provides. To help us resolve management issues and public concerns, our planning process incorporates input from the natural resource agencies of the State of Maryland, affected communities, individuals and organizations, our partners and the public.

Regional Context and Project Analysis Areas

The regional context (map 1.2) for our analysis is the waters and wetlands of the Chesapeake Bay and the watershed defined by the Atlantic Coast Joint Venture as the Chester River and Kent County Bayshore focus area (*http://www.acjv.org/wip/acjv_wip_midatlantic.pdf*). The regional context encompasses the farmlands and riverine wetlands that support major waterfowl populations on the upper eastern shore of Maryland. None of the other lands of the Refuge Complex occur in this focus area.

The project analysis area (map 1.3) includes the tidal marshes and uplands of Eastern Neck island over which the Service has direct management control and the mesohaline (brackish) portion of the Bay that includes waters north of Kent Island along the upper Eastern Shore of Maryland, including the waters at the mouth of the Chester River defined as the Lower Chester River Basin, that are of major significance to waterfowl and other Service trust resources.

The Service and the Refuge System Policies and Mandates Guiding Planning

The U.S. Fish and Wildlife Service and its Mission

The Service is part of the Department of the Interior. The Service's mission is

> *"Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."*

Congress entrusts to the Service the conservation, protection and enhancement of these national natural resources: migratory birds, anadromous and interjurisdictional fish, federal-listed endangered or threatened species, interjurisdictional fish, wetlands, certain marine mammals, and national wildlife refuges. The Service also operates national fish hatcheries, fisheries assistance field offices, and ecological services field offices. It also enforces federal wildlife laws and international treaties on importing and exporting wildlife, assists states with their fish and wildlife programs, and helps other countries develop conservation programs.

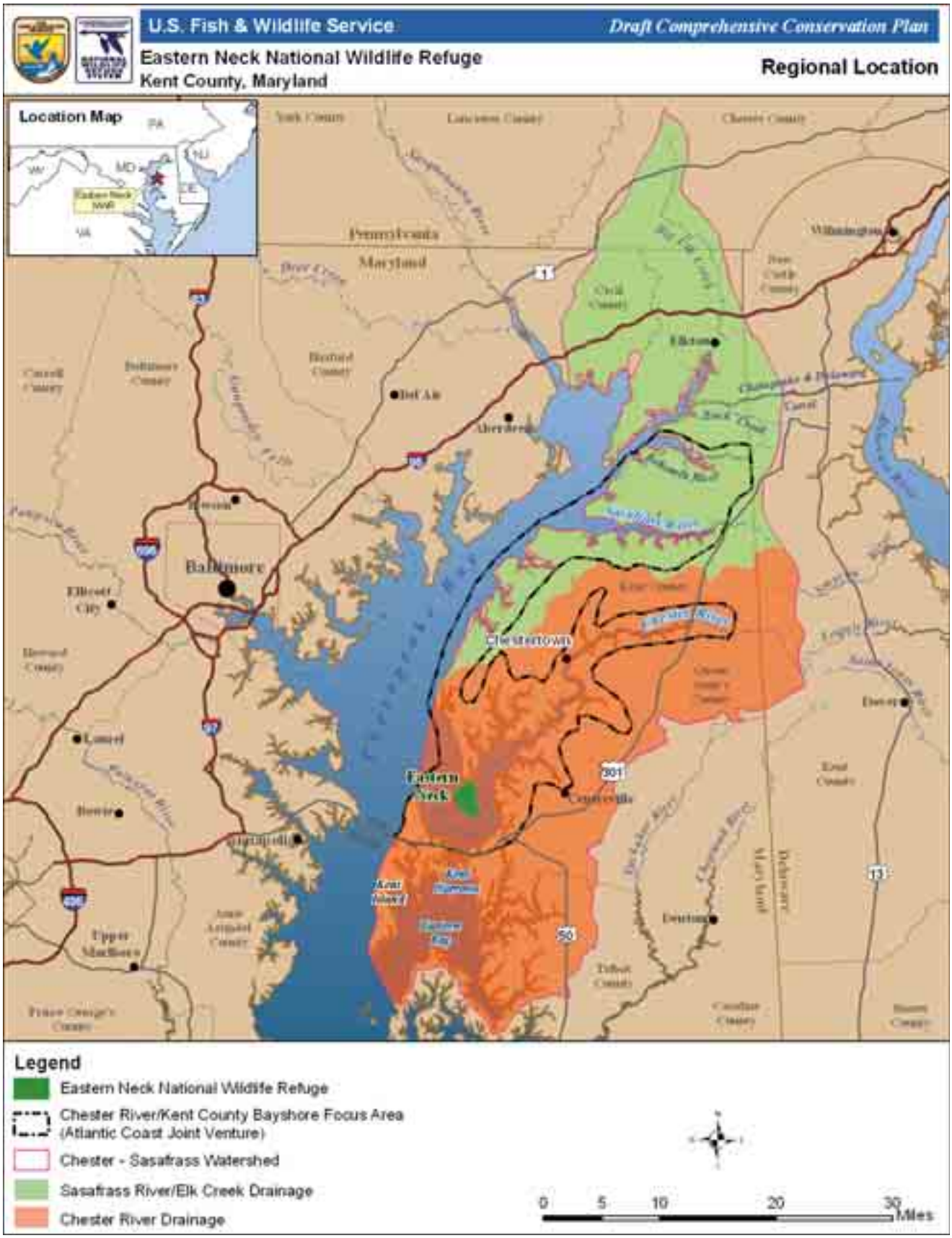
The Service manual, available online at *http://www.fws.gov/policy/manuals/*, contains the standing and continuing directives on fulfilling our responsibilities. The 600 series of the Service manual addresses land use management, and sections 601-609 specifically address management of national wildlife refuges.

The Service publishes special directives that affect the rights of citizens or the authorities of other agencies separately in the Code of Federal Regulations (CFR); the Service manual does not duplicate them (see 50 CFR 1–99 online at *http://www.gpoaccess.gov/cfr/index.html*).

James Prince/USFWS

Wood duck

Map 1.2. Eastern Neck Regional Context



Map 1.3. Eastern Neck Refuge Project Analysis Area

The National Wildlife Refuge System and its Mission and Policies

The Refuge System is the world's largest collection of lands and waters set aside specifically for the conservation of wildlife and the protection of ecosystems. More than 550 national wildlife refuges encompass more than 150 million acres of lands and waters in all 50 states and several island territories. Each year, more than 40 million visitors hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretation on refuges.

In 1997, President William Jefferson Clinton signed into law the Refuge Improvement Act. That act establishes a unifying mission for the Refuge System.

> *"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."* —Refuge Improvement Act; Public Law 105-57

It also establishes a new process for determining the compatibility of public uses on refuges and requires us to prepare a CCP for each refuge. The act states that the Refuge System must focus on wildlife conservation. It also states that the mission of the Refuge System, coupled with the purposes for which each refuge was established, will provide the principal management direction on that refuge.

The Refuge System Manual contains policy governing the operation and management of the Refuge System that the Service Manual does not cover, including technical information on implementing refuge polices and guidelines on enforcing laws. You can review that manual at refuge headquarters. These are a few noteworthy policies instrumental in developing this CCP.

Policy on Refuge System Planning
This policy (602 FW 1, 2, and 3) establishes the requirements and guidance for Refuge System planning, including CCPs and step-down management plans. It states that we will manage all refuges in accordance with an approved CCP that, when implemented, will help

- achieve refuge purposes;
- Fulfill the refuge system mission;
- Maintain and, where appropriate, restore the ecological integrity of each refuge and the refuge system;
- Achieve the goals of the national wilderness preservation system and the national wild and scenic rivers system; and,
- Conform to other service mandates.

That planning policy provides guidance, systematic direction, minimum requirements for developing all CCPs, and provides a systematic decision-making process that fulfills those requirements. Among them, we are to review any existing special designation areas or the potential for such designations (e.g., wilderness and wild and scenic rivers); and, incorporate a summary of those reviews into each CCP (602 FW 3).

Policy on Maintaining Biological Integrity, Diversity, and Environmental Health
This policy provides guidance on maintaining or restoring the biological integrity, diversity, and environmental health of the Refuge System, including the protection of a broad spectrum of fish, wildlife, and habitat resources in refuge

ecosystems. It provides refuge managers with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and restore lost or severely degraded environmental components. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem (601 FW 3).

Policy on Appropriateness of Refuge Uses
Federal law and Service policy provide the direction and planning framework for protecting the Refuge System from inappropriate, incompatible or harmful human activities and ensuring that visitors can enjoy its lands and waters. This policy (603 FW 1) provides a national framework for determining appropriate refuge uses in an effort to prevent or eliminate those uses that should not occur in the Refuge System. It describes the initial decision process the refuge manager follows when first considering whether or not to allow a proposed use on a refuge. An appropriate use must meet at least one of the following four conditions:

1) The use is a wildlife-dependent recreational use as identified in the Refuge Improvement Act.

2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, and goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Refuge Improvement Act was signed into law.

3) The use involves the take of fish and wildlife under State regulations.

4) The use has been found to be appropriate after concluding a specified findings process using 10 criteria.

This policy can be viewed on-line at*: http://www.fws.gov/policy/library/06-5645.pdf.*

Policy on Compatibility
This policy (603 FW 2) complements the appropriateness policy. The refuge manager must first find a use is appropriate before undertaking a compatibility review of that use. If the proposed use is not appropriate, the refuge manager will not allow the use and will not prepare a compatibility determination.

Annual youth fishing derby

Jonathan Priday/USFWS

This policy and its regulations, with a description of the process and requirements for conducting compatibility reviews, can be viewed on-line at *http://policy.fws.gov/library/00fr62483.pdf.* Our summary follows:

The Refuge Improvement Act and its regulations require an affirmative finding by the refuge manager on the compatibility of a public use before we allow it on a national wildlife refuge.

A compatible use is one "that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge."

The act defines six wildlife-dependent uses that are to receive our enhanced consideration on refuges: hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

The refuge manager may authorize those priority uses on a refuge when they are compatible and consistent with public safety.

When the refuge manager publishes a compatibility determination, it will stipulate the required maximum reevaluation dates: 15 years for wildlife-dependent recreational uses; or 10 years for other uses.

The refuge manager may reevaluate the compatibility of any use at any time, for example, sooner than its mandatory date, or even before we complete the CCP process, if new information reveals unacceptable impacts or incompatibility with refuge purposes (602 FW 2.11, 2.12)The refuge manager may allow or deny any use, even one that is compatible, based on other considerations such as public safety, policy, or available funding.

Other Mandates

Although Service and Refuge System policy and the purpose(s) of each refuge provide the foundation for its management, other federal laws, executive orders, treaties, interstate compacts, and regulations on conserving and protecting natural and cultural resources also affect how we manage refuges. Our "Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service" describes many of them at *http://www.fws.gov/laws/lawsdigest/indx.html*.

Of particular note are the Federal laws that require the Service to identify and preserve its important historic structures, archaeological sites, and artifacts. NEPA mandates our consideration of cultural resources in planning federal actions. The Improvement Act requires the CCP for each refuge to identify its archaeological and cultural values. Following is a highlight of some cultural and historic resource protection laws which relate to the development of CCPs.

The Archaeological Resources Protection Act (16 U.S.C. 470aa–470ll; Pub.L. 96–95) approved October 31, 1979, (93 Stat. 721), referred to as ARPA, largely supplanted the resource protection provisions of the Antiquities Act of 1906 for archaeological items. ARPA establishes detailed requirements for issuance of permits for any excavation for or removal of archaeological resources from federal or Native American lands. It also establishes civil and criminal penalties for the unauthorized excavation, removal, or damage of those resources; for any trafficking in those removed from federal or Native American land in violation of any provision of federal law; and for interstate and foreign commerce in such resources acquired, transported or received in violation of any state or local law.

The Archeological and Historic Preservation Act (16 U.S.C. 469–469c; Pub.L. 86–523,) approved June 27, 1960, (74 Stat. 220) as amended by Pub.L. 93–291, approved May 24, 1974, (88 Stat. 174) carries out the policy established by the Historic Sites Act (see below). It directs federal agencies to notify the Secretary of the Interior whenever they find that a federal or federal-assisted licensed or permitted project may cause the loss or destruction of significant scientific, prehistoric or archaeological data. The act authorizes the use of appropriated, donated or transferred funds for the recovery, protection and preservation of that data.

The Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461–462, 464–467; 49 Stat. 666) of August 21, 1935, popularly known as the Historic Sites Act, as

amended by Pub.L. 89–249, approved October 9, 1965, (79 Stat. 971), declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides procedures for designating, acquiring, administering and protecting them. Among other things, National Historic and Natural Landmarks are designated under the authority of this act.

The National Historic Preservation Act of 1966 (16 U.S.C. 470–470b, 470c–470n), Pub.L. 89–665, approved October 15, 1966 (80 Stat. 915) and repeatedly amended, provides for the preservation of significant historical features (buildings, objects and sites) through a grant-in-aid program to the states. It establishes a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468–468d). This act establishes an Advisory Council on Historic Preservation, which became a permanent, independent agency in Pub.L. 94–422, approved September 28, 1976 (90 Stat. 1319). The act created the Historic Preservation Fund. It directs federal agencies to take into account the effects of their actions on items or sites listed or eligible for listing on the National Register.

The Service also has a mandate to care for museum properties it owns in the public trust. The most common are archaeological, zoological, botanical collections, historical photographs, historic objects, and art. Each refuge maintains an inventory of its museum property. Our museum property coordinator in Hadley, Massachusetts, guides the refuges in caring for that property, and helps us comply with the Native American Grave Protection and Repatriation Act and federal regulations governing federal archaeological collections. Our program ensures that those collections will remain available to the public for learning and research.

Other Federal resource laws are also important to highlight as they are integral to developing a CCP. The Wilderness Act of 1964 (16 U.S.C. 1131–1136; Pub.L. 88–577) establishes a National Wilderness Preservation System (NWPS) that is composed of Federal-owned areas designated by Congress as "wilderness areas." The act directs each agency administering designated wilderness to preserve the wilderness character of areas within the NWPS, and to administer the NWPS for the use and enjoyment of the American people in a way that will leave those areas unimpaired for future use and enjoyment as wilderness. The act also directs the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 acres or more and every roadless island (regardless of size) within National Wildlife Refuge and National Park systems for inclusion in the National Wilderness Preservation System. Service planning policy requires that we evaluate the potential for wilderness on refuge lands, as appropriate, during the CCP planning process.

The Wild and Scenic Rivers Act of 1968, as amended, selects certain rivers of the nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, preserves them in a free-flowing condition, and protects their local environments. Service planning policy requires that we evaluate the potential for wild and scenic rivers designation on refuge lands, as appropriate, during the CCP planning process.

Chapter 4, "Environmental Consequences," evaluates this plan's compliance with the acts noted above, and with the Clean Water Act of 1977 as amended (33 U.S.C. 1251, et seq.; Pub.L. 107–303), the Clean Air Act of 1970 as amended (42 U.S.C. 7401 et seq.), and the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531–1544), as amended. Finally, we designed this draft CCP/EA to comply with NEPA and the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508).

Conservation Plans and Initiatives Guiding the Project

Birds of Conservation Concern 2008 Report (USFWS 2008)

The Service developed this report (USFWS 2008) as an update to their 2002 report in consultation with the leaders of ongoing bird conservation initiatives and such partnerships as Partners In Flight (PIF), the North American Waterfowl Management Plan (NAWMP) and Joint Ventures, the North American Waterbird Conservation Plan (NAWCP), and the U.S. Shorebird Conservation Plan. It fulfills the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act of 1980 (100 Pub. L. 100–653, Title VIII), requiring the Secretary of the Interior, through the Service, to "identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities.

The geographic scope of this endeavor is the U.S. in its entirety, including island "territories" in the Pacific and Caribbean. The report encompasses three distinct geographic scales—the North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), the eight Service Regions, and National—and is primarily derived from assessment scores from three major bird conservation plans: the Partners in Flight North American Landbird Conservation Plan, the U.S. Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. Bird species included on lists in the report include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, and Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. Population trends, threats distribution, abundance and relative density were all factors considered.

This report is intended to stimulate coordinated and collaborative proactive conservation actions among federal, state, tribal, and private partners. It is hoped that by focusing attention on these highest-priority species, this report will promote greater study and protection of the habitats and ecological communities upon which these species depend, thereby contributing to healthy avian populations and communities. You may view the report at: *http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf*. This is one of the plans we used in identifying species of concern in appendix A, and in developing management objectives and strategies in goals 1 and 2.

North American Waterfowl Management Plan (NAWMP; update 2004) and Joint Venture Plans

Originally written in 1986, the NAWMP describes a 15-year strategy for the United States, Canada, and Mexico to restore and sustain waterfowl populations by protecting, restoring and enhancing habitat. The plan committee, including representatives from Canada, the United States, and Mexico, has modified the 1986 plan twice to account for biological, sociological, and economic changes that influenced the status of waterfowl and to allow cooperative habitat conservation. The most recent modification in 2004 updates the latest needs, priorities, and strategies for the next 15 years, and guides partners in strengthening the biological foundation of North American waterfowl conservation and stakeholder confidence in the direction of the plan. View online at *http://www.fws.gov/birdhabitat/NAWMP/files/ImplementationFramework.pdf*.

To convey goals, priorities, and strategies more effectively, that 2004 modification comprises two separate documents: Strategic Guidance and Implementation Framework. The former is for agency administrators and policy-makers who

set the direction and priorities for conservation. The latter includes supporting technical information for use by biologists and land managers.

The plans are implemented at the regional level in 14 habitat Joint Ventures and 3 species Joint Ventures (Arctic Goose, Black Duck, and Sea Duck). Our project area lies in the Atlantic Coast Joint Venture (ACJV), which includes all the Atlantic Flyway states from Maine to Florida and Puerto Rico. The ACJV Waterfowl Implementation Plan was completed in June 2005. The refuge lies in the "Chester River and Kent County Bayshore" focus area. Map 1.1 shows the focus area, or you may view it online at *http://www.acjv.org/*.

The waterfowl goal for the ACJV is to "Protect and manage priority wetland habitats for migration, wintering, and production of waterfowl, with special consideration to black ducks, and to benefit other wildlife in the joint venture area." The Black Duck Joint Venture plan also relates to our CCP. Black ducks use the refuge during the winter although they are uncommon here during their breeding season and migration. The Black Duck Joint Venture Plan, Final Draft Strategic Plan (USFWS/CWS 1993) resides online at *http://www.pwrc.usgs.gov/bdjv/*. We used both Joint Venture plans in developing the objectives and strategies in goals 1 and 2.

Mid-Atlantic/Southern New England Bird Conservation Region (BCR-30) Implementation Plan (2007)

The New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30) provides important resources for migratory birds whose ranges span the western hemisphere. Habitats associated with coastal ecosystems provide the highest habitat values and provide critical staging areas for migratory waterfowl, waterbirds, shorebirds, and landbirds. Coastal beaches and wetlands, followed by forested upland communities, are considered the most important habitats in need of protection for migratory birds in the BCR. The Chesapeake Bay and Delaware Bay, as well as other major bays in the BCR provide resources critical to many migrating birds as they journey from their breeding sites in the north to non-breeding sites in Mexico, Central America, the Caribbean and South America.

Unfortunately, the majority of the lands within BCR 30 have been altered from their historic condition. From Boston to Washington DC, BCR 30 supports the highest density of humans on the East Coast. Much of the landscape in the BCR is dominated by urban development. Habitat loss and degradation (e.g., fragmentation, agriculture, and invasive species) are the greatest threats to bird populations in BCR 30. This plan identifies the bird species and habitats in greatest need of conservation action in this region, activities thought to be most useful to address those needs, and geographic areas believed to be the most important places for conservation work to occur. The plan is meant to be the start of a regional bird conservation initiative with partners across BCR 30 communicating their conservation planning and implementation activities to deliver high priority conservation actions in a coordinated manner.

The development of continental bird conservation plans sets the stage for implementation at smaller geographic scales and led to the development of implementation plans specific to species groups and BCRs. Within the Mid-Atlantic/Southern New England bird conservation region (BCR 30), the Partners in Flight initiative *(http://www.blm.gov/wildlife/pl_44sum.htm*), the U.S. Shorebird Conservation Plan (*http://www.fws.gov/shorebirdplan/*), the "Waterbird Conservation Plan: 2006-2010 for the Mid-Atlantic/New England/Maritimes (MANEM) region (*http://www.fws.gov/birds/waterbirds/manem/index.html)* , and the North American Waterfowl Management Plan have identified bird conservation priorities by setting population goals at the either the continental, national, or regional scales. The purpose of the BCR 30 Plan is to bring the common goals of these plans together into one format that can be used by state

agencies, non-governmental organizations (NGOs), and other bird conservation interests to implement bird conservation activities. The plan merges material from numerous plans and workshops, including, but not limited to, the BCR 30-Partners In Flight (PIF) Mini Plan, BCR 30 Coordinated Monitoring Workshop, the Mid-Atlantic New England Maritimes Regional Waterbird Plan, the December 2004 BCR 30 All-Bird Conservation Workshop, and other materials. We used this plan to help develop objectives and strategies for goals 1 and 2, and to create appendix A, "Species and Habitats of Conservation Concern." It can be accessed on-line at *http://www.acjv.org*).

North American Waterbird Conservation Plan (Version 1, 2002)

This plan (Kushlan et al. 2002) is an independent partnership among individuals and institutions interested in, or responsible for, conserving water birds and their habitats. The plan is just one element of a multi-faceted conservation program. The primary goal of the plan is to ensure that the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and non-breeding water birds are sustained or restored throughout the lands and waters of North America, Central America, and the Caribbean. It provides a framework for conserving and managing colonially nesting water-dependent birds. In addition, it will facilitate continent-wide planning and monitoring, national, state, and provincial conservation, regional coordination, and local habitat protection and management. You can access the continental plan online at *http://www.pwrc.usgs.gov/nacwcp/nawcp.html.* We used this plan to help develop objectives and strategies for goals 1 and 2, and to create appendix A, "Species and Habitats of Conservation Concern."

Mid-Atlantic/New England/Maritimes (MANEM) Waterbird Conservation Plan (2008)

A partnership of organizations and individuals working to facilitate waterbird conservation in the Mid-Atlantic/New England/Maritimes (MANEM) region of the US and Canada has developed a regional waterbird conservation plan. Over 200 partners comprising the MANEM Waterbird Working Group have compiled and interpreted technical information on the region's waterbird populations and habitats, assessed conservation status of these natural resources, developed strategies to ensure the persistence of sustainable waterbird populations in the region, and identified near term priorities. MANEM partners include wildlife managers, scientists, policy makers, educators and funders.

The MANEM region consists of Bird Conservation Regions 14 (Atlantic Northern Forest) and 30 (New England/Mid-Atlantic Coast), and Pelagic Bird Conservation Regions 78 (Northeast US Continental Shelf) and 79 (Scotian Shelf). The MANEM Waterbird Conservation Plan is being implemented within the context and framework of the North American Waterbird Conservation Plan—a project of the Waterbird Conservation for the Americas Initiative *(www.waterbirdconservation.org).*

Seventy-four waterbird species utilize habitats in MANEM for breeding, migrating and wintering. Avian families include loons, grebes, shearwaters, storm-petrels, boobies, pelicans, cormorants, herons, ibises, rails, gulls, terns, skuas, jaegers and alcids. Partners in four subregions of MANEM selected 43 Focal Species for immediate conservation action. In addition, 55 of MANEM's waterbirds are identified in state wildlife action plans as Species of Greatest Conservation Need. You can access information on Mid-Atlantic/New England/Maritimes Regional planning online at *http://www.fws.gov/birds/waterbirds/MANEM/.* We used this plan to help develop objectives and strategies for goals 1 and 2.

U.S. Shorebird (2001, 2nd ed.) and North Atlantic Regional Shorebird (2000) Plans

Concerns about shorebirds led to the creation of the U.S. Shorebird Conservation Plan in 2000. Brown, et al. published a second edition in May 2001. Developed under a partnership of individuals and organizations throughout the United States, the plan develops conservation goals for each U.S. region, identifies

important habitat conservation and research needs, and proposes education and outreach programs to increase public awareness of shorebirds and of threats to them. You may read the U.S. Shorebird Plan online at *http://www.fws.gov/shorebirdplan/USShorebird/downloads/USShorebirdPlan2Ed.pdf.*

In the Northeast, the North Atlantic Regional Shorebird Plan was also drafted to step down the goals of the continental plan to smaller scales to identify priority species, species goals, habitats, and prioritize implementation projects. The North Atlantic Regional Shorebird Plan appears online at *http://www.fws.gov/shorebirdplan/RegionalShorebird/RegionalPlans.htm*. We used both plans in developing our objectives and strategies for goals 1 and 2.

National Bald Eagle Management Guidelines (2007)

In July 2007, the Service issued a final ruling to officially remove the bald eagle from the Federal list of endangered and threatened species due to its successful recovery throughout its range in the lower 48 states. The bald eagle continues to be protected by the Bald and Golden Eagle protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The Service developed these National Bald Eagle Management Guidelines to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the Eagle Act may apply to their activities. The Guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute disturbance," which is prohibited by the Eagle Act. The Guidelines are intended to: (1) publicize the provisions of the Eagle Act that continue to protect bald eagles, in order to reduce the possibility that people will violate the law, (2) advise landowners, land managers and the general public of the potential for various human activities to disturb bald eagles, and (3) encourage additional nonbinding land management practices that benefit bald eagles. The document is intended primarily as a tool for landowners and planners who seek information and recommendations regarding how to avoid disturbing bald eagles. You can view these management guidelines at: *http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.* We referred to these guidelines as we developed management objectives and strategies for bald eagles.

Chesapeake Bay Bald Eagle Recovery Plan (1982)

The successful recovery of the bald eagle was, in part, due to the implementation of regional bald eagle recovery plans. During development of this CCP, we referred to the Chesapeake Bay Recovery Plan for any management recommendations that are still relevant to ensuring the survival and productivity of bald eagles in the Chesapeake Bay area.

Partners-in-Flight Bird Conservation Plans

In 1990, Partners-in-Flight (PIF) began as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private industries, and citizens dedicated to reversing the population declines of bird species and "keeping common birds common." The foundation of its long-term strategy is a series of scientifically based bird conservation plans using physiographic areas as planning units.

The goal of each PIF plan is to ensure the long-term maintenance of healthy populations of native birds, primarily non-game birds. The plan for each physiographic area ranks bird species according to their conservation priority, describes their desired habitat conditions, develops biological objectives, and recommends conservation measures. The priority ranking factors in habitat loss, population trends, and the vulnerability of a species and its habitats to regional and local threats.

Physiographic Area 44—Mid-Atlantic Coastal Plain (April 1999).
Our project area lies in Physiographic Area 44, the Mid-Atlantic Coastal Plain. In developing our habitat goals and objectives, we referred to its draft plan, online at *http://www.blm.gov/wildlife/pl_44sum.htm*.

The plan (PIF, 1999) includes objectives for the following habitat types and associated species of conservation concern on the refuge:

- Barrier and Bay Islands: piping plover, American black duck, Wilson's plover, brown pelican, American oystercatcher, black skimmer, least tern, and gull-billed tern.
- Salt Marsh: salt marsh sharp-tailed sparrow, black rail, prairie warbler, Henslow's sparrow, seaside sparrow, sedge wren, American black duck, and clapper rail.
- Forested Wetland: cerulean warbler, Swainson's warbler, Kentucky warbler, Acadian flycatcher, yellow-throated vireo, prothonotary warbler, and Louisiana waterthrush.
- Mixed Upland Forest: cerulean warbler, wood thrush, Kentucky warbler, Acadian flycatcher, worm-eating warbler, eastern wood-pewee, and Louisiana waterthrush.
- Early Successional: prairie warbler, Bachman's sparrow, Henslow's sparrow, blue-winged warbler, upland sandpiper, and white-eyed vireo.
- Fresh/Brackish Emergent Wetland: American black duck, king rail.

We used this plan to help develop objectives and strategies for goals 1 and 2, and to create appendix A, "Species and Habitats of Conservation Concern."

A Management Plan for the Eastern Population of Tundra Swans (July 2007)

Responsibility for preparing migratory bird flyway management plans lies with Flyway Councils, which are administrative bodies who represent state and provincial wildlife agencies in North America. The Flyway Councils work cooperatively with the Service, the Canadian Wildlife Service, and the Mexican government's wildlife agency (SEMARNAT). The Eastern Population (EP) of tundra swans has been managed under a joint, four flyway management plan first developed and implemented in 1982, with additions and updates occurring in 1988 and 1998. Since 1998, a number of research projects have cast light upon some of the uncertainties identified in the 1998 plan. This 2007 plan, prepared by the Ad Hoc Eastern Population Tundra Swan Committee of the four Flyway Councils, incorporates new information, particularly related to the use and accuracy of mid-winter counts, and updates its recommendations for the long-term conservation of these swans. It can be accessed on-line at *http://www.mdwfa.org/flyway.html*.

Tundra swan

Dave Herr/USFWS

The specific purpose of this plan is to identify population goals, establish guidelines and priorities for management actions, identify strategies and assign responsibilities, specify levels of public use and emphasize research needs to improve the management of EP swans. The primary management goal is to maintain an EP tundra swan population of 80,000 in the Atlantic and Mississippi Flyways. The plan discusses how the protection of breeding, staging, and wintering habitat is critical to this goal and to the long-term maintenance of EP tundra swans and the habitats they rely upon.

Eastern Neck refuge and the surrounding shallow water habitats contribute to this goal by providing important staging and wintering habitat for tundra swans. We consulted this plan and its recommended management actions as we developed an objective and strategies for tundra swan under goal 1.

A Management Plan for the Atlantic Population of Canada Geese (Draft; July 2007)

The Atlantic Flyway Council's Canada Goose committee provides this update to the Atlantic Flyway Canada Goose Management Plan developed in 1989. The 1989 plan established population objectives and placed emphasis on status assessments using wintering ground survey information. In 1996, in response to dramatic declines in the Atlantic Population (AP) Canada goose population, coupled with an increase in the resident Canada goose population, the Atlantic Flyway Council developed an action plan to address immediate survey and research needs that would help guide management to rebuild AP goose numbers. Management efforts since 1996 have been directed towards ensuring population growth, resulting in a significant turnaround. This 2007 plan provides management guidelines to promote continued growth of the AP goose population at sustained higher levels. It can be accessed on-line at *http://www.mdwfa.org/flyway.html*.

The overall management goal in this plan is to maintain the AP Canada goose population and their habitats at a level that provides optimum opportunities for people to use and enjoy geese on a sustainable basis. The population objective believed necessary to achieve this goal is to maintain an index of 250,000 breeding pairs of AP Canada geese in the Ungava region of Québec, Canada.

One of the long-term strategies for maintaining this population is the conservation of important breeding, staging, and wintering habitats. Eastern Neck refuge provides staging and wintering habitat. We consulted this plan as we developed objectives and strategies under goal 1.

Atlantic Flyway Mute Swan Management Plan (July 2003)

The Atlantic Flyway Council's Snow Goose, Brant and Swan Committee prepared this plan in response to the exponential growth of the invasive, exotic mute swan population in the flyway that was occurring between 1986 and 2002, especially in Maryland and Virginia where the populations were doubling every 12 years. Mute swans are a Eurasian species, not native to North America. They are highly invasive of wetland habitats, impact native species of fish and wildlife, damage commercial agricultural crops, and pose a threat to human health and safety. Because of their consumption of large quantities of submerged aquatic vegetation (SAV) and aggressive behavior, they compete directly with many other native waterbirds and fisheries for limited resources in critical habitats.

The goal of this management plan is to "reduce the mute swan populations in the Atlantic flyway to levels that will minimize negative ecological impacts to wetland habitats and native migratory waterfowl and to prevent further range expansion into unoccupied areas." This plan lists five specific management objectives and numerous associated strategies to achieve this goal. It can be accessed on-line at *http://www.mdwfa.org/flyway.html*.

We consulted this plan, as well as the Chesapeake Bay Program's mute swan plan (see below) and the Maryland DNR mute swan plan (also below) to develop strategies for dealing with this invasive species. We discuss in chapter 3, under "Actions Common to All Alternatives" our intent to continue working closely with Maryland Department of Natural Resources (MD DNR) in controlling this species.

Mute Swan in the Chesapeake Bay: A Bay-wide Management Plan (June 2004)

This plan was prepared by the Chesapeake Bay Program's Mute Swan Working Group. We describe the successful partnership that is the foundation of the Chesapeake Bay Program below. Mute swans were identified as one of the highest concerns among the partners in the program when asked which species are causing, or have the highest potential to cause, adverse ecological effects in the Bay's ecosystem. In response to this elevated concern, a working group was formed, comprised of researchers, and federal and state natural resource managers, to develop a bay-wide regional mute swan management plan.

The goal of the plan is to manage the Chesapeake Bay population of mute swans to a level that a) minimizes the impacts on native wildlife, important habitats, and local economies; b) minimizes conflict with humans; c) is in agreement with the Chesapeake Bay Program's Chesapeake 2000 Agreement goals for SAV and invasive species; and, d) is in agreement with the Atlantic Flyway Mute Swan Management Plan. The plan identifies management objectives and strategies that will work to meet this goal. It can be accessed on-line at *http://www.mdwfa.org/flyway.html.*

We consulted this plan, as well as the other mute swan plans identified below, as we considered management actions to control mute swan. We describe those in chapter 3, Alternatives, under "Actions Common to All Alternatives." Our intent is to continue working closely with MD DNR to control this species.

Atlantic Flyway Resident Canada Goose Management Plan (July 1999)

This plan was cooperatively written by the state, provincial, and federal agencies responsible for managing local-nesting or "resident" Canada geese in the Atlantic Flyway. It does not prescribe specific regulations or dictate management policies or programs, but identifies an overall management goal and five management objectives developed by all the cooperators. The concern with resident Canada geese is that their numbers began to escalate in the 1980s and biologists became concerned that their numbers might be masking a decline in the number of migratory AP Canada geese. This concern was coupled with the recognition that the resident geese were contributing significantly to sport harvests, and human/goose conflicts in urban and suburban areas. Banding studies have confirmed that these resident geese are a distinct population from the migratory AP Canada geese with very different management needs and opportunities.

We consulted this plan as we considered alternative management actions to benefit waterfowl under goal 1 objectives. Our intent is to continue working closely with MD DNR in controlling this species. The plan can be accessed at *http://www.mdwfa.org/flyway.html.*

Partners in Amphibian and Reptile Conservation, National—State Agency Herpetological Conservation Report (Draft 2004)

Partners in Amphibian and Reptile Conservation (PARC) was created in response to the increasing, well-documented national declines in amphibian and reptile populations. PARC members come from state and federal agencies, conservation organizations, museums, the pet trade industry, nature centers, zoos, the power industry, universities, herpetological organizations, research laboratories, forest industries and environmental consultants. Its five geographic regions—Northeast, Southeast, Midwest, Southwest and Northwest—focus on national and regional herpetofaunal conservation challenges. Regional working groups allow for region-specific communication.

The National State Agency Herpetological Conservation Report (NHCR), a summary report sponsored by PARC, provides a general overview of each state wildlife agency's support for reptile and amphibian conservation and research through September 2004. Each state report was compiled in cooperation with its agency's lead biologist on herpetofaunal conservation. The purpose is to facilitate communication among state agencies and partner organizations throughout the PARC network to identify and address regional and national herpetological priorities.

PARC intends to expand the scope of the NHCR to include other states, provinces, and territories. It will also include other state agencies that are supporting herpetofaunal conservation and research, such as transportation departments, park departments, and forest agencies. The U.S. Geological Survey (USGS) is supporting the Northeastern Partners in Amphibian and Reptile Conservation Home Page as part of its contribution to PARC. It is being served by the Patuxent Wildlife Research Center, (*http://www.pwrc.usgs.gov/partners/)*

part of the USGS Eastern Region. The next NHCR will also integrate the list of species of conservation concern into each state's comprehensive wildlife conservation strategy (see below). We used the latest draft NHCR plan in developing objectives and strategies for goals 1 and 2, and in developing appendix A, "Species and Habitats of Conservation Concern."

U.S. Fish & Wildlife Service Fisheries Program, Northeast Region Strategic Plan 2009–2013 (January 2009)

The Service's Fisheries Program (Program) primary mission is to work with others to maintain self-sustaining, healthy populations of coastal and anadromous fish (fish that spend part of their lives in fresh water and part in the ocean), fish species that cross state or national boundaries, and endangered aquatic animals and their habitats. In the Northeast Region, 25 fishery management offices and national fish hatcheries work with states and other partners to restore and protect a variety of fish and other aquatic species. Examples include Atlantic salmon *(Salmo salar)*, striped bass *(Morone saxatilis)*, American shad *(Alosa sapidissima)*, river herring *(Alosa pseudoharengus, Alosa aestivalis),* Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), horseshoe crab *(Limulus polyphemus),* American eel *(Anguilis rostrata),* and menhaden *(Brevoortia tyrannus).*

The Program has played a vital role in conserving and managing fish and other aquatic resources since 1871. Today, the Program is a critical partner with states, Tribes, other governments, other Service programs, private organizations, public institutions, and interested citizens in a larger effort to conserve these important resources. In 2002, working with its many partners in aquatic conservation through the Sport Fishing and Boating Partnership Council's Fisheries Steering Committee, the Service completed its Strategic Vision (Vision) document: "Conserving America's Fisheries, U.S. Fish and Wildlife Service Fisheries Program Vision for the Future." That vision document includes goals, objectives, and action items on a national programmatic scale.

The Program is committed to working with partners to

- Protect the health of aquatic habitats;
- Restore fish and other aquatic resources; and
- Provide opportunities to enjoy the many benefits of healthy aquatic resources.

The Regional Fisheries Program Strategic Plan (Plan) is an extension of the vision, describing more specifically the tactics to be implemented by the Northeast Region to fulfill the goals and objectives identified in the vision. The first plan covered years 2004 to 2008. The current plan can be viewed at *http://www.fws.gov/northeast/fisheries/.*

This plan brings together changing national direction, institutional knowledge, analysis of spatial information, and the perspectives of our state and tribal partners to develop a strategic plan that allows this regional program to prioritize its efforts during challenging times, while promoting positive change into the future. As the plan is implemented it will we build on a strong foundation of active partnerships and past accomplishments, while recognizing that continued communication, cooperation and expansion of partnerships is essential for successful implementation of this plan and fulfillment of the Program's resource responsibilities and obligations. This plan was built off the lessons learned from implementing the 2004-2008 strategic plan, which was very broad.

One step-down effort resulting from the plan is the identification and ranking of fish and other aquatic species as to their level of conservation concern by

hydrologic unit. We used this ranking and have consulted with the Regional Fisheries Program staff in developing aquatic objectives and strategies under goals 1 and 2, and in creating appendix A, "Species and Habitats of Conservation Concern."

Maryland Department of Natural Resources, Wildlife Diversity Conservation Plan (MD DNR 2005),

In 2002, Congress created the State Wildlife Grant (SWG) Program, and appropriated $80 million in state grants. The purpose of the program is to help state and tribal fish and wildlife agencies conserve fish and wildlife species of greatest conservation need. The funds appropriated under the program are allocated to states according to a formula that takes into account their size and population.

To be eligible for additional federal grants and satisfy the requirements for participating in the SWG program, each state and U.S. territory was to develop a statewide "Comprehensive Wildlife Conservation Strategy" and submit it to the National Advisory Acceptance Team by October 1, 2005. Each plan was to address eight required elements, identify and focus on "species of greatest conservation need," yet address the "full array of wildlife" and wildlife-related issues, and "keep common species common."

The MD DNR called their plan a "Wildlife Diversity Conservation Plan" (WDCP). The goal of the plan is to create a vision for conserving that state's wildlife and stimulate other states, federal agencies, and conservation partners to think strategically about their individual and coordinated roles in prioritizing conservation.

In addressing the eight elements below, the Maryland WDCP supplements and validates the information on species and habitat and their distribution in our analysis area, and helps us identify conservation threats and management strategies for species and habitats of conservation concern in the CCP. The expertise that convened to compile this plan and the partner and public involvement further enhances its benefits for us. We used it in developing objectives and strategies for goals 1 and 2, and in developing appendix A, "Species and Habitats of Conservation Concern." These are the eight elements.

1) Information on the distribution and abundance of species of wildlife, including low and declining populations, as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife;

2) Descriptions of locations and relative condition of key habitats and community types essential to the conservation of species identified in element 1;

3) Descriptions of problems that may adversely affect species identified in element 1 or their habitats, and priority research and survey efforts needed to identify factors that may assist in restoration and improved conservation of these species and habitats;

4) Descriptions of conservation actions necessary to conserve the identified species and habitats and priorities for implementing such actions;

5) Plans proposed for monitoring species identified in element 1 and their habitats, for monitoring the effectiveness of the conservation actions proposed in element 4, and for adapting those conservation actions to respond appropriately to new information or changing conditions;

6) Description of procedures to review the plan at intervals not to exceed 10 years;

7) Plans for coordinating, to the extent feasible, the development, implementation, review, and revision of the plan strategy with federal, state, and local agencies and Native American tribes that manage significant areas of land and water within the state, or administer programs that significantly affect the conservation of identified species and habitats; and,

8) Plans for involving the public in the development and implementation of plan strategies.

This plan can be accessed on line at *http://www.dnr.state.md.us/wildlife/divplan_wdcp.asp*

Other Regional Information Sources

We also consulted the plans and resources below as we refined our management objectives and strategies, especially those with a local context.

Chesapeake Bay Program. The Chesapeake Bay Program is a unique regional partnership directing and conducting the restoration of the Bay since the signing of the historic 1983 Chesapeake Bay Agreement. The Chesapeake Bay Program partners include the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the U.S. Environmental Protection Agency, representing the federal government; and participating advisory groups. Since its inception in 1983, the Bay Program's highest priority has been the restoration of the Bay's living resources, including finfish, shellfish, Bay grasses including SAV, and other aquatic life and wildlife. Improvements include fisheries and habitat restoration, recovery of Bay grasses, nutrient and toxic reductions, and significant advances in estuarine science. The Program is responsible for many valuable reports and publications on Bay resources and is an important source of information for us. Many of these publications can be found on-line at *http://www.chesapeakebay.net/bayresourcelibrary.aspx?menuitem=13998.*

In 2000, the partnership decided to reaffirm its commitment and update its vision and goals. The result is the "Chesapeake 2000 Agreement." Five goals were established under the themes "Living Resources Protection and Restoration;" "Vital Habitat Protection and Restoration;" Water Quality Protection and Restoration;" "Sound Land Use;" and, "Stewardship and Community Engagement." We reviewed this plan's goals and recommended management actions as they relate to all our CCP goals, objectives and strategies.

In April 2007, the Program released its *Chesapeake Bay 2006 Health and Restoration Assessment*. The report gives watershed residents a clear and concise synopsis of Bay health and on-the-ground restoration efforts taking place across its vast watershed (*http://www.chesapeakebay.net/content/publications/cbp_26038.pdf*). The report is divided into two parts: Ecosystem Health and Restoration Efforts. This format of reporting, first used to detail the condition of the Bay in 2005, allows the Bay Program partnership to look at the effectiveness of clean-up actions across the entire watershed and allocate restoration efforts appropriately.

Maryland Department of Natural Resources (MD DNR). We have consulted with MD DNR staff and many of their publications in developing our plan. In addition to their state WDCP, their publication "Mute Swans in Maryland: A Statewide Management Plan" (April 14, 2003) was instrumental in developing our strategies to address invasive mute swans. We are a committed partner with MD DNR in controlling mute swans and fully subscribe to the

recommendations they made in this plan. This plan can be accessed on line at *http://www.dnr.state.md.us/wildlife/finalmsplan.pdf*

Chester River Association (CRA). This group is an advocate for the health of the Chester River and the living resources it supports. CRA strives to promote stewardship of the Chester River—its forests, marshes, fields, creeks, and streams—as well as an understanding of the river's place in the economic and cultural life of our communities. In its efforts to improve water quality, educate the public and facilitate resolution of river-related issues, CRA is a voice for the Chester River. CRA was founded in 1986 and established its Chester Riverkeeper program in 2002. Through meetings, forums, field trips, publications, habitat restoration projects, the Chester Testers and collaboration with community groups and government agencies, CRA strives to improve water quality and increase public awareness of river and watershed issues. Our partnering for water quality improvement in the Lower Chester River Basin would include non-governmental organizations like the CRA.

Kent County Comprehensive Plan, May 2006. This comprehensive plan is the statement of development policy for Kent County by the County Commissioners. The Plan presents a series of goals and strategies to guide the preparation of County regulations and the application of County programs. These goals and policies are organized in eight functional categories dealing with the economy, towns and villages, the countryside, the environment, housing, transportation, community facilities and public services, and historic and cultural preservation. Each section contains a summary of important issues and trends. We used the land use and land use trends data in this plan to evaluate socioeconomic impacts.

Bayscape Garden on the Refuge

Jonathan Priday/USFWS

Eastern Neck Refuge Management Profile

Eastern Neck Refuge Establishing Authority and Purpose

Eastern Neck refuge was established by executive order on December 27, 1962, under the Migratory Bird Conservation Act (16 U.S.C. 715 d) "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." By virtue of its strategic location at the confluence of the Chester River and the Bay, it is of significant value to migrating and wintering waterfowl on Maryland's Upper Eastern Shore.

Before it became a refuge, farming and hunting prevailed as uses on the island, which was known as one of Maryland's best hunting areas. Today, the refuge provides habitat for more than 240 bird species, including bald eagles. It hosts a large variety of migrating waterfowl and provides staging and wintering habitat for tundra swans, a population of global importance. Although they are a rare sight on the refuge today, in the past, the refuge has supported a population of the Federal-listed endangered Delmarva fox squirrel (DFS).

Map 1.4 depicts the current refuge and its features.

Eastern Neck Refuge Management Context

Human populations within the analysis area and the Chesapeake Bay watershed are rapidly increasing. By 2020, the population within the watershed is expected to increase almost 33 percent (Maryland Office of Planning 2000).

The influx of humans causes substantial changes in land use. In 25 years, more than 3,500 square miles of forest, wetlands, and farms—an area 50 times greater than Washington, D.C.—will have been converted to suburban or urban uses (Chesapeake Bay Foundation 2000). The available open space is declining (e.g., farms, fields, forests, wetlands and other wildlife habitats), and the areas that remain are becoming more and more fragmented. At the same time, land use and ownership patterns are changing, as a generational shift occurs.

Economic and cultural stresses are acting to replace a landscape dominated by communities of watermen, farmers, and forest owners grounded in a rural economy, with a landscape of vacation homes, retirement communities, and waterfront estates grounded in a suburban economy. Population growth, habitat fragmentation, and other land use changes on the Eastern Shore mainland and on other Bay islands must serve as an important backdrop for the refuge, since these forces ultimately result in elemental changes to fish, wildlife, and plant populations and to ecosystem processes. They create logistical problems in land management, maintenance, and law enforcement, and produce significant recreational demands and pressures on the CM Refuge Complex.

Prior to Service acquisition of the Eastern Neck refuge lands in 1962, the bulk of the lands were in the large ownerships of hunting clubs (FWS 1971). One exception was the Cape Chester Development Corporation which owned a major tract on the island and had sub-divided it into many small lots. Only one home had been built prior to Service acquisition; that home became the original refuge headquarters. Eastern Neck Island was spared the impacts of development and allowed to revert largely to natural vegetation. The refuge now serves both as a highly valued natural area for consumptive and non-consumptive wildlife-dependant recreational uses with 70,000 visitors annually and as a demonstration area for natural landscapes with native species plantings, best management farming practices, and alternative energy.

Map 1.4. Eastern Neck Refuge Boundary and Features

Refuge Administration

The refuge is administered as part of the CM Refuge Complex, with headquarters in Cambridge, Maryland on Blackwater refuge. Staffing and budget decisions are made by the Refuge Complex Project Leader.

Refuge Operational Plans ("Step-down" Plans)

Refuge System planning policy lists more than 25 step-down management plans that may be required on refuges. Those plans contain specific strategies and implementation schedules for achieving refuge goals and objectives. Some plans require annual revisions; others require revision every 5 to 10 years. Some require additional NEPA analysis, public involvementt, and compatibility determinations before we can implement them.

The following step-down plans are those we are pursuing for this refuge. This document incorporates by reference those that are up-to-date. Chapter 3 provides more information about the step-down plans needed and their schedule for completion.

The Integrated Pest Management, Chronic Wasting Disease, and Avian Influenza plans have recently been completed for the Refuge Complex and address Eastern Neck refuge.

The following plans will be developed for the entire CM Refuge Complex, with details on Eastern Neck refuge incorporated.

- Law Enforcement Plan
- Safety Plan

The following plans will be completed as separate Eastern Neck refuge plans.

- Habitat Management Plan (HMP; highest priority step-down plan to be completed after CCP approval)
- Annual Habitat Work Plan (AHWP; updated annually and provides details on habitat management for the forthcoming year)
- Inventory and Monitoring Plan (IMP)
- Fire Management Plan (also, see appendix F for Fire Management Program Guidance)
- Visitor Services Plan (VSP)

In Chapter 3, "Alternatives Considered, Including the Service-preferred Alternative," under the section "Actions Common to All of the Alternatives, Refuge Step-Down Plans" we include a schedule for these plans. Additional plans may be required depending on the alternative selected for the final CCP.

Refuge Vision

Very early in the planning process, our team developed this vision statement to provide a guiding philosophy and sense of purpose in the CCP.

> *"Eastern Neck National Wildlife Refuge will sustain diverse and healthy tidal marsh, aquatic and uplands habitats so the refuge supports robust populations of Federal trust species and remains an essential link in the network of conserved lands in the Chesapeake Bay. Our successes will be supported by the strong partnerships we develop with other Federal agencies, State agencies, conservation organizations, land managers, and neighboring communities. Working with those partners will provide*

the opportunity to showcase and demonstrate a science-based, adaptive management approach, with emphasis on the protection and restoration of shoreline and tidal marsh.

We will continue to reward all who visit with an opportunity to immerse themselves in the natural sights and sounds of the Chesapeake Bay. The thrill of observing more than 100,000 migrating and wintering waterfowl moving in and out of the refuge each year, including the rare tundra swan, is an experience that forms a lasting impression about the wonders of nature. Visitors will also be delighted by the refuge's healthy populations of bald eagles and ospreys as they dive for fish and attend to their young. They will also enjoy the opportunity to observe the phenomenon of over 100 species of birds migrating through each fall. We will enhance these and other refuge experiences by providing exceptional interpretive and visitor programs about the Chesapeake Bay and its rich diversity of natural and cultural resources.

We hope residents of neighboring communities on the Delmarva Peninsula will value the refuge for enhancing their quality of life. Within the National Wildlife Refuge System, the refuge will be treasured for conserving the Chesapeake Bay's Federal trust resources and providing inspirational outdoor experiences for present and future generations of Americans."

Refuge Goals

We developed the following goals after considering the vision, the purposes of the refuge, the missions of the Service and the Refuge System, and the mandates, plans, and conservation initiatives above. These goals are intentionally broad, descriptive statements of purpose. They highlight elements of our vision for the refuge we will emphasize in its future management. The biological goals take precedence; but otherwise, we do not present them in any particular order. Each offers background information on its importance. In chapter 2, "Alternatives Considered, Including the Service-preferred Alternative," we evaluate different ways of achieving these goals.

GOAL 1

Protect and enhance Service trust resources and species and habitats of special concern in the Chesapeake Bay region.

Our highest priority over the next 15 years is to protect against additional refuge shoreline erosion and loss of refuge tidal marsh. Shoreline and tidal marsh habitats are threatened by erosive forces and invasive species; nearby shallow waters and submerged aquatic vegetation (SAV) beds also face these threats and the impact of pollutants. The integrity of the refuge, and its ability to support both aquatic and terrestrial Federal trust species and habitats, depends on stemming shoreline, tidal marsh and SAV bed losses. The protection and monitoring of species that rely on these habitat areas, such as inter-jurisdictional fish, shellfish, and other aquatic species on the refuge, is an important part of this goal.

These habitat areas and others on the island also sustain nesting bald eagles, and a wide diversity of other migratory songbirds and waterfowl. Managing refuge habitats, as part of a regional partnership to sustain wintering populations of migratory waterfowl and contribute to North American Waterfowl Management Plan population goals is another important aspect of this goal. The upper eastern shore of the Bay has historically sustained the greatest concentrations of Atlantic Population (AP) Canada geese and other wintering waterfowl in the Atlantic Flyway. Wintering birds are attracted to the Chester River basin because of its extensive areas of brackish tidal marsh, open shallow water, and

SAV beds. Eastern Neck refuge, which is uniquely located in the lower Chester River basin and the only protected Federal land on the upper eastern shore of Maryland, provides sanctuary, shelter from severe weather, and food to sustain these wintering waterfowl and other migratory birds. The rare tundra swan also winters in the shallow waters near the refuge.

Other Federal trust resources covered by this goal are the many archeological and cultural resources on refuge lands. The refuge's long history of pre-colonial and colonial uses has resulted in structures and sites eligible for the National Historic Register.

GOAL 2 **Maintain a healthy and diverse complex of natural community types comprised of native plants and animals to pass on to future generations of Americans.**

Eastern Neck refuge supports a wide diversity of habitats, with brackish tidal marshes, natural ponds and impoundments, upland forests, hedgerows, and grasslands, and a variety of managed rotational croplands. In addition to the waterfowl and bald eagles mentioned in goal 1, these habitats support a broad array of breeding and migrating songbirds and other wildlife. It is a stopping over point for migrating monarch butterflies and also sustains many other species of breeding butterflies and other insects and invertebrates. Our challenge is to use our available resources as effectively as possible to deal with invasive plants and animals, optimize the mix of habitat types, and accommodate compatible wildlife-dependent public uses. Our goal is to manage these habitats to sustain a diversity of native species for the long term and to minimize invasive species.

GOAL 3 **Conduct effective outreach activities and develop and implement quality, wildlife-dependent public use programs, with an emphasis on wildlife observation and photography, to raise public awareness of the refuge and the Refuge System, and promote enjoyment and stewardship of natural resources in the Chesapeake Bay region.**

Our desire is to be a recognized, welcomed, and valued part of the Eastern Shore community. Our concern is that we are not well known in the Kent County area. Raising the visibility of the Service, the NWRS, and the refuge will encourage people to learn about the importance of refuge habitats and species of concern, and the refuge's role in conserving Bay resources. An effective outreach program will enhance support for our programs and allow us to proactively anticipate and deal with public issues if they arise.

Hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation are the six priority wildlife-dependent public uses identified in the Refuge Improvement Act. The Act stipulates those six uses are to receive enhanced consideration in refuge planning, but does not establish a hierarchy among those six uses. Opportunities to engage in them should be provided to the extent compatible with specific refuge goals and objectives. The ability to fund the management of these activities is also a factor for refuge managers to consider in determining their compatibility. Service policy requires that refuge managers set limits on, and establish stipulations for, any of those activities as warranted to ensure their compatibility. Each of these activities is already facilitated on current refuge lands.

An analysis in 2006 conducted by the Northeast Region's Visitor Services' team recommended that we focus on wildlife observation and wildlife photography opportunities on this refuge. Our goal is to improve current opportunities for those programs as a priority, and enhance other compatible programs

to the extent feasible, through expanded programs, new infrastructure or improved access.

The Comprehensive Conservation Planning Process

Service policy establishes an eight-step planning process that also facilitates our compliance with NEPA (Figure 1.1).[2] Our planning policy and CCP training course materials describe those steps in detail. We followed that process in developing this draft CCP/EA.

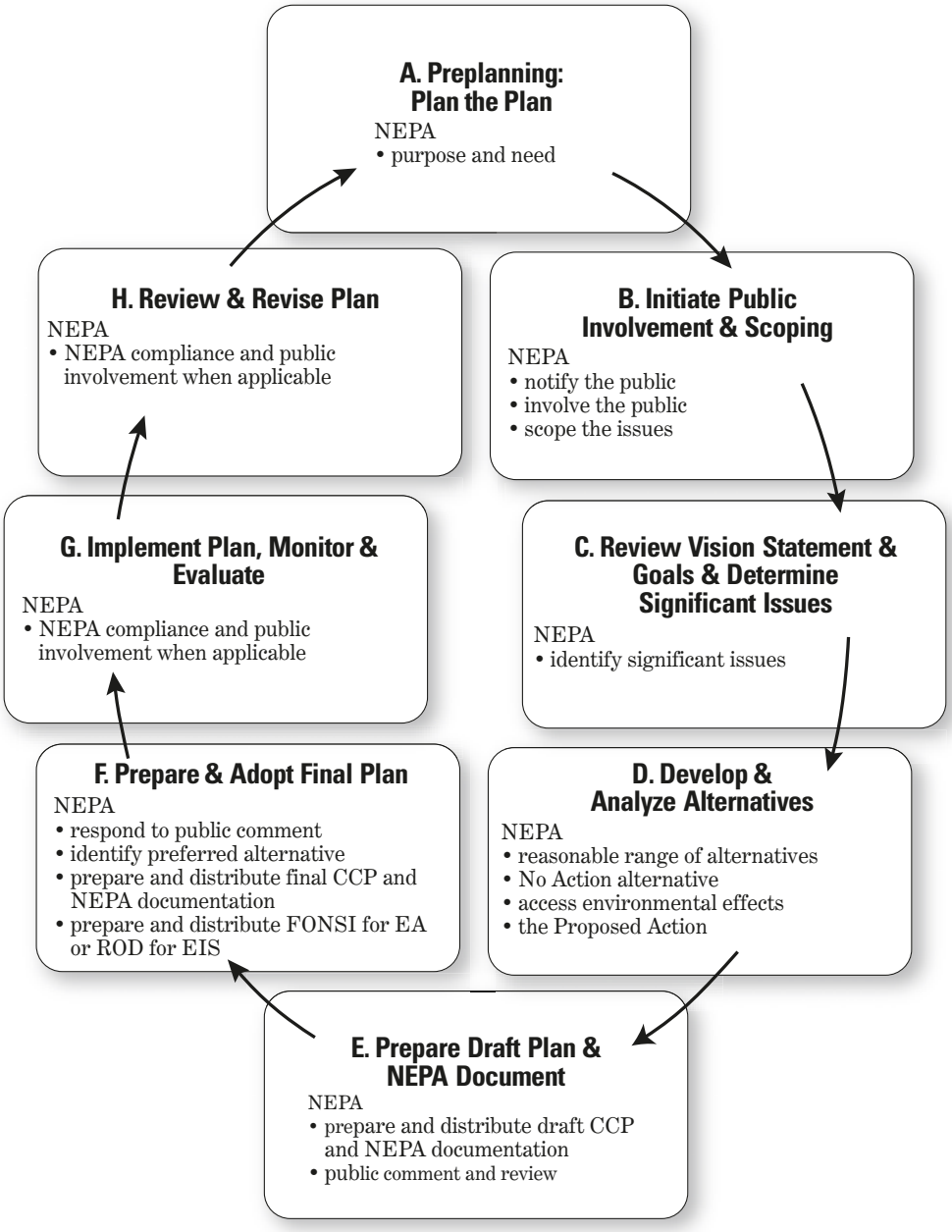


Figure 1.1. The Comprehensive Conservation Planning Process

[2] 602 FW 3, "The Comprehensive Conservation Planning Process" *(http://policy.fws.gov/602fw3.html)*

Planning team meeting

USFWS

Since 1962, we have focused on conserving and managing Eastern Neck refuge to help sustain migratory and wintering waterfowl and other trust species, facilitating wildlife-dependent public uses, managing habitat for species, such as the bald eagle, and establishing and maintaining good relationships with the community and our partners. In 2001, we began to prepare for developing a CCP by collecting information on refuge resources and mapping its habitats. We undertook the following actions to complete planning steps A-D.

- Held first CCP core team meeting in September 2001; drafted a vision statement and identified preliminary issues.
- Hosted an intra-agency Visitor Services Station Evaluation in September 2001.
- Hosted an intra-agency Biological Program Station Evaluation in October 2001.
- Published a Federal Register Notice of Intent (NOI) in June 2002.
- Distributed a planning newsletter in spring 2002 to announce project kick-off, and share draft vision statement.
- Held public scoping meetings in June 2002.
- Distributed a planning newsletter in spring 2003 summarizing public scoping comments and announcing project would be put on hold to complete other regional CCP projects overdue.
- Held a conservation priorities workshop with regional experts in November 2006.Distributed a planning newsletter in December 2006 to announce CCP process reinitiated, and share draft goals.
- Published a Federal Register NOI in January 2007 to announce CCP process reinitiated.
- Hosted a public meeting in January 2007.

- Held a series of CCP team meetings to develop alternatives from February–June 2007.

- Consulted with Service and state experts in analyzing the alternatives during June 2007 to June 2008.

As part of the planning process, we also evaluated Service fee-owned lands on the refuge for their possible inclusion into the National Wilderness Preservation System. We completed that evaluation in 2007 with the recommendation that we not proceed further with a wilderness study because we determined that refuge lands do not meet the criteria for eligibility. Appendix D shows the results of our assessment.

We will complete "Step E: Prepare Draft Plan and NEPA document," by publishing our Notice of Availability (NOA) in the Federal Register announcing the release of this draft CCP/EA and by distributing this document for public review. During a 30-day period of public review, we will hold a public meeting to obtain comments. We also expect to receive comments by regular mail, electronic mail, or at public meetings. After the comment period expires, we will review and summarize all of the comments we have received and develop our responses. We will present them in an appendix to the final CCP.

Once we have prepared the final CCP, we will submit it to our Regional Director for his review and approval. He will determine whether a Finding of No Significant Impact (FONSI) is appropriate, and certify whether the final CCP meets agency compliance requirements, achieves refuge purposes, and helps fulfill the mission of the Refuge System. With an affirmative FONSI and other positive findings, the Regional Director can approve the final CCP. If that happens, we will publish another Federal Register NOA to announce the availability of the final plan. That will complete "Step F: Prepare and Adopt a Final Plan." We can then begin "Step G: Implement Plan, Monitor and Evaluate."

We will modify the final CCP as warranted following the procedures in Service policy (602 FW 1, 3, and 4) and NEPA requirements as part of "Step H: Review and Revise Plan." Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will require only an Environmental Action Memorandum. We must fully revise CCPs every 15 years.

Development of Issues

Because the refuge is part of the CM Refuge Complex, we are addressing its management goals, opportunities and issues in the larger context of the Refuge Complex, as well as in terms of the refuge's own unique location, history and resource attributes. In developing the issues to be addressed in Eastern Neck refuge CCP planning, we reviewed the whole array of issues addressed during the CM refuge complex CCP process and brought forward those that were directly relevant to Eastern Neck refuge management. We added issues identified in the 2002 and 2007 scoping phases done specifically for Eastern Neck refuge and those that that were identified in our public participation efforts.

The CM Refuge Complex CCP planning team identified four major issue areas:

1) Potential effects of an expanding human population and changing demographics on Service trust resources;

2) Potential effects of land acquisition and refuge expansion;

3) Potential effects of habitat changes; and

4) Potential effects on floral and faunal populations.

We do not plan to acquire additional lands or expand the refuge, so we did not include Issue Area 2 in our planning. The CM Refuge Complex CCP does not address cultural or historic resources at the issue level. However, a substantial number of cultural and historic resources are known at Eastern Neck refuge and others are likely to be found in the future. Therefore, because we need to protect those Federal trust resources while meeting our primary wildlife management objectives, we identified them as a separate issue area.

In formulating the refuge issues, we framed them as questions for objectivity, clarity, and ease of understanding.

Eastern Neck refuge key issue areas are:

Issue Area 1. How can we most effectively address ongoing threats to refuge habitats and native fish and wildlife species?

Issue Area 2. What species and habitats should be our management priority, how should we manage to benefit them, and what other environmental values can we support?

Issue Area 3. How can we address the effects of expanding human populations and increasing recreational demand in the Chesapeake Bay region on Service trust resources at the refuge?

Issue Area 4. How can we best address potential effects on cultural and historic resources?

Issue Area 1. How can we most effectively address ongoing threats to refuge habitats and species, Including those from Climate Change?

There are substantive threats to the wildlife species and habitats of the refuge that must be addressed in any plan that seeks to manage refuge resources to benefit wildlife and allow wildlife-related public uses. Significant shoreline erosion threatens the integrity of the island and surrounding tidal marsh habitats. Permanent habitat loss is the end result. This is our highest priority and immediate management concern. The long-term success of any management activity we propose for wildlife or refuge habitats, whether it be in the wetlands or uplands, depends upon our ability to reduce shoreline erosion and tidal marsh loss. All of these concerns, and actions we take to address them, need to be evaluated in light of long-term climate change impact predictions. Rising sea level, rising air and water temperatures, increased intensity of storm events are a few of the major changes that could influence the future integrity, diversity, and health of our habitats and the species that depend on them.

Invasive plants on the refuge

USFWS

Pollutants and erosion also threaten the submerged aquatic plants and shallow water habitats that support waterfowl and other species in the lower Chester River basin near the refuge. Invasive plants threaten refuge tidal marsh and upland habitats. We address this issue area through our objectives and strategies under Goals 1 and 2.

Invasive and exotic species are also a current threat to refuge habitats. Much of the refuge's uplands are inundated with numerous invasive or exotic plants that outcompete native vegetation. The loss of native vegetation compromises the habitat quality for many wildlife

How can we best mitigate shoreline erosion and wetland loss?
Past studies have shown that the Bay shoreline is severely eroding in many areas (USACOE 1986, VIMS 1977, Singewald 1946). Particularly hard hit are the islands off the Eastern Shore. Since colonial times, at least 10,800 acres have been lost in the middle-eastern portion of the Bay alone. The shoreline recession rates of many islands exceed 10 ft per year, with an associated load of approximately 2,541,717 kg (2,500 tons) of sediment per mile annually entering the Bay (Offshore and Coastal Technologies 1991).

Loss of brackish tidal wetlands at the refuge is occurring along the shoreline due to erosion. This has been mitigated on the bayside by a recent Army Corps of Engineers project that placed a series of breakwaters with small inlets, behind which vegetation restoration is underway. In an area restored with clean dredge spoil material, volunteers planted *Spartina alterniflora* and other wetland grasses in an attempt to improve the habitat, restore lost wetlands, and reduce future erosion.

Erosion on the Chester River side threatens SAV beds and the island, particularly at Hail Point. Hail Point Marsh, which is designated as a Research Natural Area, provides 130 acres of undisturbed marsh for wildlife habitat and biological research. However, at present, there are no intensive research projects being pursued here. The Hail Point area also serves as a major migration site for a significant number of monarch butterflies each year.

Our discussion below about predicted climate change impacts describes further challenges related to addressing erosion and loss of wetlands.

How can we protect and restore submerged aquatic vegetation (SAV) and shallow water habitat?
Water clarity and SAV health at the refuge also are being impacted, and some of the most important waterfowl wintering habitats in the region are being lost. The presence of SAV beds is one of the most significant determinants for sustaining waterfowl populations. Unfortunately these are very susceptible to pollution and poor water quality. Nutrients entering the Chester River from farm fields, septic systems, and other sources stimulate algae growth, which blocks sunlight required by SAV for photosynthesis. Subsequent plant decay consumes the water's dissolved oxygen—a process that can result in "dead zones" where oxygen-dependent organisms can no longer survive. A bi-weekly water quality monitoring program was instituted in 2003 on the refuge at Bogles Wharf. The most significant parameter of the water quality testing program is turbidity which impacts the health of SAV and dependent biota. Protecting SAV is also a factor in mute swan management.

Unless the related problems of erosion and SAV loss are addressed, the refuge's value as a natural environment within the Bay will severely diminish. We must decide what actions we can take to address this problem effectively and efficiently, and what level of resources we can commit to this issue.

What are the best strategies to control invasive and exotic plants on the refuge?
Non-native or exotic plants introduced from other parts of the world or other parts of the country have degraded many natural ecosystems and are a major problem for the refuge. Invasive plants can spread rapidly, smothering or out-competing native vegetation. Ecosystems impacted by invasive, non-native plants have a reduced ability to clean air and water, stabilize soil, buffer floods, and provide wildlife food and shelter.

Invasive plants at the refuge are a significant problem; they are established on over 50% of refuge lands. These plants are prolific, often overtopping and choking out other plants and depleting or eliminating valued wildlife habitats. The refuge currently has 15 species of invasive plants; four considered as species of concern: mile-a-minute, *Phragmites*, Johnsongrass, and Canada thistle weed. Invasive species of concern are actively controlled; the refuge tracks the spread and control of invasive plants utilizing Geographic Information Systems (GIS), Global Positioning Systems (GPS), permanent vegetation monitoring plots, and photo points. In 2006, 400 out of a reported 1,250 acres of land infested with invasive plants were treated on the refuge. Treatment successfully controlled invasive plants on 50 of these 400 acres.

We are currently studying the effectiveness of a series of control measures on five invasive plant species by monitoring for five seasons (summer/fall) post treatment from 2007 to conclude fall 2011. At issue is how we can most effectively and efficiently utilize limited refuge resources to control invasive plant species. Total eradication is probably not possible for many species. Mile-a-mile and *Phragmites* are the most problematic at the refuge in terms of their impacts on native environments. Some species, such as Japanese honeysuckle, are exotic and may be somewhat invasive, but may not directly impact refuge management objectives. While some invasive plant control actions are included in chapter 2, "Alternatives Considered Including the Service-preferred Alternative," in the section, "Actions Common to All Alternatives," the alternatives also evaluate additional levels of effort and different methods of invasive plant control. Please refer to chapter 3, "Affected Environment," for a more detailed discussion of the mile-a-minute and *Phragmites* problems on the refuge.

What actions can Service staff implement on refuge lands to minimize the projected impacts to habitats and species from global and regional climate change?

Climate change is an issue of increasing public concern because of its potential effects on land, water, and biological resources. The issue was pushed to the forefront in 2007 when the Intergovernmental Panel on Climate Change (IPCC), representing the world's leading climate scientists, concluded that it is "unequivocal" that the Earth's climate is warming, and that it is "very likely" (a greater than 90 percent certainty) that the heat-trapping emissions from the burning of fossil fuels and other human activities have caused "most of the observed increase in globally averaged temperatures since the mid-twentieth century" (IPCC 2007). According to the Northeast Climate Impacts Assessment team, "continued warming, and more extensive climate-related changes to come could dramatically alter the region's economy, landscape, character, and quality of life" (NECIA 2007).

Other predicted major climate-related changes beyond warming air temperatures, include changing patterns of precipitation, significant acceleration of sea level rise, changes in season lengths, decreasing range of nighttime versus daytime temperatures, increasing water temperatures, declining snowpack, and increasing frequency and intensity of severe weather events (TWS 2004). In the Chesapeake Bay region, the implications of sea-level rise are the most disconcerting within the next few decades. According to the National Wildlife Federation in their technical publication "Sea-Level Rise and Coastal Habitats in the Chesapeake Bay Region (2008)," the Chesapeake Bay region "…is one of the most vulnerable places in the nation to the impacts of sea-level rise."

The ramifications of sea-level rise in the bay area, most notably erosion and saltwater intrusion, are exacerbated by the low-lying topography, growing coastal population, and the naturally-subsiding coastal lands (NWF 2008). The

EPA reports that in the region, erosion rates caused by sea-level rise will be "… higher than those that have been observed over the past century" (EPA 2009). Of increasing concern is that fact that rising sea-level is causing saltwater intrusion into estuaries and freshwater areas, reducing the diversity and extent of saltmarsh habitat, killing trees and other vegetation, and threatening many plant and animal species dependent on a certain level of salinity (NWF 2008). The ability of saltmarsh to migrate inland, or establish at higher elevations as sediment builds up in other areas, is severely hampered by the level of development and shoreline armoring that has occurred in many areas of the Chesapeake Bay.

Since wildlife species are closely adapted to their environments, they must respond to climate variations, and the subsequent changes in habitat conditions, or they will not survive. Unfortunately, the challenge for wildlife is complicated by increases in other environmental stressors such as pollution, land use developments, ozone depletion, exotic species, and disease. The NWF reports that a decline in saltwater marsh, and SAV and eelgrass beds will adversely impact the nursery and spawning habitat of many fish species, shellfish beds, waterbird and waterfowl wintering and breeding habitat, and aquatic mammals and reptiles such as Federal-listed sea turtles, the endemic diamondback terrapin, beaver and otter.

Many wildlife professionals and conservation organizations recommend we manage refuge lands using an adaptive management framework, and increase biological research, monitoring and inventories. According to the NWF, these actions are important for land managers to undertake in order to reduce our vulnerability and to build in the flexibility to effectively respond to the uncertainty of future climate change effects. Ultimately, we hope our management will reduce environmental stressors, provide support for self-sustaining populations, and ensure widespread habitat availability through land protection and conservation.

Issue Area 2. What species and habitats should be our management priority, how should we manage to benefit them, and what other environmental values can we support?

The refuge contains about 1,200 acres of upland habitats and 1,000 acres of wetlands. Across these acres a variety of habitats including marsh, forest, freshwater impoundments and agricultural fields support a diversity of plant and animal species that include waterfowl, bald eagles, resident and migratory songbirds, upland birds, hawks, marsh birds and shore birds.

Our mandated Service management priority is to protect and sustain Federal trust resources including wetlands, migratory birds, endangered and threatened species, and interjurisdictional species. With that general requirement in mind, we need to decide how best to meet the needs of the particular priority species present on the refuge and the habitats that sustain them. To facilitate that decision making, we conducted a habitat management workshop on January 17, 2007, that convened biologists and resource managers from Federal and State agencies, and the academic and research community. The results of that workshop are reflected in these issue discussions. We address this issue area through our objectives and strategies under goal 1.

What Species should be our Management Priority?

Waterfowl

Most wildlife biologists and stakeholders at the January 17, 2007, meeting believed the focus of wildlife management at the refuge should continue to be for the benefit of migratory and wintering waterfowl. The refuge was established to host a large variety of migratory birds, particularly waterfowl, and is a major staging and over-wintering area for tundra swans. The Chester River over-winters approximately 100,000 AP Canada geese—more than any other area on the East Coast. Thousands of those Canada geese utilize the refuge, which

offers sustenance as well as sanctuary. The refuge's marshes and surrounding waterways host waterfowl year round, including one percent of the world's tundra swan population.

At issue is determining the amount of resources we should commit to benefiting waterfowl, and what specific management actions we should undertake to achieve the greatest benefit.

Other Trust Species and State Species of Concern

Federal-Listed, or Recently De-listed, Endangered and Threatened Species

The Endangered Species Act clearly mandates that we manage for Federal-listed species. Refuge lands contributed to the recovery of the peregrine falcon and the Chesapeake Bay bald eagle populations. Both species have been removed from the Federal list, but they are still afforded protection under migratory bird laws. Presently, the only federal-listed species occurring on the refuge is the endangered Delmarva fox squirrel (DFS).

In conjunction with other Service experts we explored the potential to undertake recovery efforts for the federal threatened northeastern beach tiger beetle and Puritan tiger beetle, but there appears to be limited potential for recovery on the refuge due to a lack of suitable habitat. Should we learn more in the future, we would reconsider implementing efforts for those two species.

Bald Eagle. In 2006, Eastern Neck refuge provided nesting habitat for seven active pairs of bald eagles. Current management actions include inventory and monitoring of nesting pairs, protection of nest trees, and prohibiting human disturbance to nesting pairs. Because the refuge supports nesting bald eagles, we can continue our role in supporting eagle productivity. There may also be opportunities to expand our role for wintering and roosting eagles.

At issue is determining what we can effectively do to benefit this species, including active management, monitoring or additional inventories.

Delmarva Fox Squirrel. We describe in chapter 2, "Affected Environment" the history of DFS management on the refuge. The introduced refuge population peaked in the 1970's and early 1980s, but is now close to zero. Over the last five years, we have not pursued active management for this species because it was determined to be ineffective. Together with the DFS Recovery Team, we have recently determined that supplementing the refuge population by translocating squirrels back onto the refuge is an action not deemed essential to DFS recovery and would be more effective in other locations within its range. At issue, however, is determining what level of monitoring or inventory effort should be in place to protect those that remain.

Interjurisdictional Aquatic Species

Fish in rivers and coastal waters move across boundaries of states and nations; individual governments are unable to effectively manage or conserve these interjurisdictional fisheries. To coordinate actions of multiple governments, interjurisdictional organizations have been formed voluntarily, by treaty, or by act of Congress. The Service, through the Fish and Wildlife Management Assistance program, works cooperatively with these organizations to conserve, restore, and manage fish stocks and the habitat on which they depend. In coastal waters, organizations like the Atlantic States Marine Fisheries Commission were formed by Congress to address interstate fisheries issues.

The Atlantic States Marine Fisheries Commission (*http://www.asmfc.org/*) was formed by the 15 Atlantic coast states in 1942 in recognition that fish do not

adhere to political boundaries. The Commission serves as a deliberative body, coordinating the conservation and management of the states shared near shore fishery resources—marine, shell, and anadromous—for sustainable use.

The Commission's Interstate Fisheries Management Program (ISFMP) began in 1981, with the signing of a cooperative agreement with the National Marine Fisheries Service (NMFS). Currently, the ISFMP coordinates the conservation and management of 22 Atlantic coastal fish species or species groups.

American eel	Horseshoe crab	Spot
American lobster	Northern shrimp	Spotted seatrout
Atlantic croaker	Red drum	Striped bass
Atlantic herring	Scup	Summer flounder
Atlantic menhaden	Shad and river herring	Tautog
Atlantic sturgeon	Spanish mackerel	Weakfish
Black sea bass	Spiny Dogfish & Coastal Sharks	Winter flounder
Bluefish		

For species that have significant fisheries in both state and federal waters (i.e., Atlantic herring, summer flounder, Spanish mackerel), the Commission works cooperatively with the relevant East Coast Regional Fishery Management Councils to develop fishery management plans. The Commission also works with NMFS to develop compatible regulations for the federal waters of the exclusive economic zone.

The Chester River provides spawning and nursery habitat for nine anadromous fish species and 12 interjurisdictional species, two of which have State of Maryland endangered species status (FWS MDFRO 2006).

Horseshoe crab, an interjurisdictional species, is known to spawn on the southern tip of the refuge, and there is evidence to suggest the presence of an entrained population in the Chester River. Blue crab is another interjurisdictional species found in the Chester River. Spawning for this species occurs during the summer in the shallow waters surrounding the refuge. We will evaluate, in conjunction with our partners, opportunities to enhance habitat for these species.

State Species of Concern
The Maryland Wildlife Action Plan lists 502 species of greatest conservation need—that is, fish, amphibian, reptile, bird, mammal, and invertebrate species with small or declining populations or other characteristics that make them vulnerable. Of these, 161 are Maryland State-listed threatened or endangered species. We will evaluate opportunities to benefit them in our management objectives where it seems the refuge could be of value.

One example of a species of elevated concern is the diamondback terrapin. Once abundant within the Chesapeake Bay, northern diamondback terrapins are facing a decline resulting from loss of nesting habitat due to waterfront development, erosion control measures, and invasive species; loss of SAV beds providing foraging habitat; commercial harvesting in the areas in which terrapins reside during winter months; mortality from boating and fishing (physical impacts and by-catches); and rising predator populations. Terrapins represent an active commercial fishery managed by the MD DNR. In 2006, emergency legislation was passed to place new restrictions on terrapin harvest. These restrictions included the banning of winter scraping of hibernacula, the limitation of the terrapin harvest from August to October, and the setting of a slot size limit on

the catch. The slot limit protects large females from harvest but unfortunately allows capture of smaller terrapins including males.

At issue is what we can do to enhance habitat for these species, in partnership with Maryland DNR.

What Habitats should be our Management Priority?
Managed Waterfowl Habitats
The refuge's croplands, moist soil units (MSUs) and green tree reservoirs (GTRs) are managed to sustain migrating and wintering waterfowl. MSUs are low-lying, naturally wet, non-forested areas where water is impounded seasonally. On the refuge, late summer precipitation is held by earthen berms to create flooded areas, primarily to benefit fall migratory and wintering waterfowl, and to a lesser extent shorebirds and wading birds. Decomposing vegetation and invertebrates provide a rich foraging area. GTRs are forested lowlands that are temporarily flooded during the fall and winter to attract waterfowl. Flooding occurs when trees are dormant, but when waterfowl are still present and can forage on the acorns and seeds, and macroinvertebrates. Water control structures in GTR areas allow water levels to be manipulated.

How can we balance maintaining croplands for waterfowl with other management priorities? Currently 557.1 acres of rotational croplands provide habitat for migrating and wintering waterfowl, particularly Canada geese, black ducks, mallards, pintails, and teal. The crop rotation and management practices we use on the refuge's croplands are described in chapter 2, Affected Environment. There is controversy about the value to wildlife of maintaining croplands on the refuge as opposed to other less-intensively managed habitat types which could provide waterfowl feeding habitats. Opinions vary as to the amount and distribution of farm fields, the vegetative cover used on the borders between fields, and the particulars of cooperative farming methods. Some question whether this management is consistent with the goals for other refuge resources.

The AP Canada geese are a focal species on the refuge. This population was once considered the largest Canada goose population in North America and the staple of waterfowl hunters in the Atlantic Flyway. Winter indices approached one million birds by the mid-1980s and annual harvests often exceeded those of any duck species. However, between 1986 and 1995, the wintering Canada geese in the Atlantic Flyway declined from 900,000 to 650,000 although numbers of "resident" Canada geese increased.

Breeding surveys of nesting areas in northern Quebec documented a more precipitous decline in AP Canada goose numbers from 118,000 nesting pairs recorded in 1988 to 90,000 in 1993, 40,000 in 1994, and 29,000 pairs in 1995. This dramatic change in numbers of AP geese, greater than 75 percent in less than a decade, prompted State, Federal, and Provincial wildlife agencies in 1995 to suspend the sport hunting season of AP Canada geese in the United States and in the Canadian Provinces of Ontario and Quebec. Since the ban was placed on sport hunting during the 1995 hunting season, the status of AP Canada geese appears to have improved substantially from the low of 29,000 pairs estimated in 1995 (Serie and Hindman, 1997).

The objective of cropland management on the refuge is to provide extremely important migrating and wintering habitat for the Canada geese, black duck and other waterfowl. The reduction in native foraging plants, such as wild rice and SAV, has necessitated providing supplemental "high energy" forage, especially during harsh winters. Over the past 2-3 decades, the extent and distribution of farm fields was also designed to provide habitat for the DFS, which experts had

recommended a 2:1 forest to crop ratio was optimal for the squirrels. Now that we propose to no longer focus active management for DFS, the issue is whether to reconsider the design of our current farming program to support Canada geese and other waterfowl, or whether to eliminate farming and provide natural vegetation cover as migrating and wintering habitat instead.

Should we continue to maintain and improve other habitats to sustain waterfowl? The refuge's 38 acres of green tree reservoirs (GTRs) are bottomland hardwoods that flood in the fall after the trees go dormant. GTRs provide feeding habitat for wintering and migratory waterfowl, including wood ducks, mallards, black ducks, and teal. In addition, we currently have 30 acres of managed and unmanaged MSUs for Canada geese, black ducks, mallards, teal, and pintail. Conservation organizations such as Ducks Unlimited have advocated for an expanded program, in particular, increasing the acreage and number of moist soil units. Advocates suggest that, in addition to waterfowl benefits, these units can be managed to provide important shorebird and water bird migration habitat. Other opinions expressed include the desire for a reduction in actively managed habitat and a shift in focus to managing for what would be considered naturally occurring native plant communities typical of Maryland's Eastern Shore and the wildlife those plant communities would sustain.

FIDS Habitat Criteria

The Chesapeake Bay Critical Area Program was established in 1984 with the passage of the Critical Area Act in the State of Maryland. The law mandated the development of regulations (Critical Area Criteria) to protect water quality, conserve plant and wildlife habitat and direct growth and development. One of the requirements of the Criteria is the protection and conservation of breeding habitat for forest interior dwelling birds (FIDS) (CAC 2005). The Criteria identify two FIDS habitat types for which conservation is mandated:

(1) Existing riparian forests (for example, those relatively mature forests of at least 300 feet in width which occur adjacent to streams, wetlands, or the Bay shoreline, which are documented breeding areas)

(2) Forest areas utilized as breeding areas by forest interior dwelling birds and other wildlife species (for example, relatively mature forested areas within the Critical Area of 100 acres or more, or forest connected with these areas)

Although both habitat type descriptions mention minimium areas, some smaller forested areas may also support FIDS as well, depending on the characteristics of the forest tract and surrounding landscape. FIDS habitat may be absent in forests larger than 100 acres. Therefore, in addition to considering the acreage of a forest when identifying potential FIDS habitat, forest characteristics like forest age, shape, forest edge-to-area ratio, vegetative structure and composition, topography and degree of human disturbance should be taken into consideration as well as the character of the surrounding landscape, including proximity to large forested areas, percent of contiguous forest in surrounding area, habitat quality of nearby forest tracts and adjacent land uses (CAC 2005).

Forest Habitats

How can we best manage our forest habitat for wildlife benefits? Prior to European settlement, the Eastern Shore was heavily forested. The predominante forest type was hardwood, most likely oak-hickory, oak-gum, or oak-pine type and increasingly mixed with pine toward the south. Large patches of pine-dominated woods exist today,but are largely second-growth forest due to extensive clearing since European settlement. Very little original forest, or "old growth," exists in the region today.

Eastern Neck refuge contains approximately 708 acres of forested land, comprised primarily of loblolly pine, hardwoods, and mature oak-sweetgum forest. Forested acres occur in relatively small forest stands scattered throughout the Island and are interconnected by hedgerows consisting primarily of black cherry and locust. Forest stands range from one to more than 100 years old, and function as buffer zones and corridors utilized by a variety of species. Forested refuge land also provides

nesting trees and roosting areas for the bald eagle, and for two high priority PIF species—wood thrush and Eastern wood pewee, and six moderate- or low-priority PIF species.

Because of the interspersion of other cover types, there are no relatively large contiguous blocks 100+ acres of forest (see text box) that would help support breeding birds that prefer such habitat. Service migratory bird experts suggest that because of the island's isolation, even if it were totally forested, it would contribute limited forest interior dwelling bird species (FIDS) breeding habitat and would not be a regionally significant contributor to sustaining FIDS (Dettmers pers comm. 2007). Management decisions on the amounts and interspersion of habitat types will determine to what extent forest habitats can be sustained on the refuge, particularly larger contiguous forested areas.

Other Potential Habitat Values
An additional directive for achieving refuge purposes and the Refuge System mission is related to biological integrity, diversity, and environmental health (BIDEH). This requires that we consider and protect the broad spectrum of native fish, wildlife, plant, and habitat resources found on a refuge:

> "In administering the System, the Secretary shall…ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans…" (Refuge Improvement Act, Section 4(a)(4)(B)).

The *Policy on Biological Integrity, Diversity and Environmental Health* (601 FW 3.3) is the Service's statement of how it will implement this mandate. The policy provides information and guidance to manage your refuge in such a way to prevent degradation of BIDEH. It also offers ways to restore lost or severely degraded ecological components, where appropriate.

The policy explains the relationships among BIDEH, the NWRS mission, and refuge purposes as follows:

> "…each refuge will be managed to fulfill refuge purpose(s) as well as to help fulfill the System mission, and we will accomplish these purpose(s) and our mission by ensuring that the biological integrity, diversity, and environmental health of each refuge are maintained, and where appropriate, restored." (601 FW 3[3.7B]).

At the refuge, within a landscape that has been managed for centuries, we needed to consider ways to meet our biological integrity, diversity and environmental health mandate. Could we enhance our capabilities through research and demonstration projects? Could we maintain a diversity of habitats of substantive benefit to wildlife?

Small grassland and shrubland areas on the refuge add to refuge habitat diversity and to overall refuge biodiversity, but we need to determine to what extent resources devoted to their management would be of substantive value to Federal trust species or other species of concern. We need to consider to what extent we should divert resources and habitat space that would otherwise support waterfowl and their habitats to manage for this diversity.

Should we actively manage to provide grassland habitat? We currently maintain approximately 31 acres of grasslands, primarily in one field near the former refuge headquarters, which we plant with native grasses and wildflowers to

benefit migratory butterflies, particularly the monarch butterfly, as well as grassland songbird species and birds of prey. We have conducted prescribed burning to help maintain these grasslands, rather than letting them convert to shrub habitat. Large expanses of grasslands are crucial for grassland dependent species such as the eastern meadowlark and the grasshopper sparrow. Grasslands are in limited availability throughout the region, and therefore many grassland bird species have been in decline throughout the east. Refuge lands, however, have limited capability to provide productive grassland bird habitat of this size for those species. Many people advocate maintaining the fields near the former headquarters as a wildlife viewing area due to the concentrations of butterflies. Thus, we need to consider to what extent Eastern Neck refuge should continue to provide this habitat.

Should we actively manage to provide shrubland habitat? Approximately 18 acres of upland and wetland shrub habitat occurs on the refuge. Upland shrub habitat is primarily associated with field hedgerows or the early stages of forest development. Shrubland bird species, such as the yellow-breasted chat and white-eyed vireo, are documented on the refuge, but are not thought to be well-distributed or densely populated. Some biologists advocate that we expand upland shrub habitat on the refuge, beyond that provided by hedgerows, due to the increasing number of breeding and migrating birds of conservation concern that rely on this habitat. However, there is also concern that maintaining shrubland in hedgerows would exacerbate the already major problem of invasive plants, such as mile-a-minute, that prefer those areas and also contribute to further fragmenting the croplands important to wintering waterfowl. Some shrub habitat is created as we pursue those forest objectives that transition fields to forest, but it is only transitional or temporary until trees establish.

Wetland shrub-scrub habitat, comprised of hightide bush, bayberry, and wax myrtle, exists along all forest and marsh fringe areas and other high areas throughout the tidal marsh. This may constitute a sufficient acreage to maintain this habitat diversity component without active management. In the uplands, however, maintaining a permanent, healthy, native shrub community would likely be labor intensive and expensive. Thus, we need to decide whether the benefits of actively managing for this habitat support the effort.

How can we enhance research opportunities at the refuge to help us to make better refuge management decisions?
We believe that support of high quality scientific research related to our management concerns should continue to be a significant part of our mission here. In addition to Hails Point Marsh, which is designated as a Research Natural Area, the refuge and surrounding waters has been listed as a Wetland of International Importance by the RAMSAR Convention. See chapter 2, page 2-1, for additional details on the RAMSAR listing.

Many conservation land managers are concerned by the lack of scientific data available about wildlife populations, their habitats, and effects of management actions needed to inform their decision-making. This is particularly true on refuges where managers developing adaptive management programs, when habitat-specific rather than species-specific management is being emphasized, when promoting biodiversity has become an almost universal management goal, when long-term ecological monitoring is considered a critical component by the scientific community, and when the occurrence of rare species is of both public and regulatory interest. Public comment encourages the refuge to conserve and restore natural habitats, and to monitor conditions in partnership with state agencies, other Federal agencies, NGOs, universities, and research institutions.

During public scoping we received recommendations that we should pursue a more active research, inventory and monitoring program. Four specific information gaps were identified and there were recommendations that we implement the following:

1) A baseline inventory of the occurrence and spatial distribution of flora and selected fauna;

2) A long-term monitoring program to determine climate change-related trends in selected flora and fauna;

3) An adaptive management program to guide significant habitat and population management actions;

4) Detailed research into habitat-species relationships. Some of the more obvious relationships for investigation are waterfowl use of managed refuge habitats and habitat requirements for species of conservation concern.

At issue is to what extent we facilitate research over the next 15 years, and what research should be a priority for the refuge.

What demonstration projects should we continue to support?
Resources are limited and some people claim that we should focus where the greatest long term benefit to resources and society is predicted. We have heard a range of opinions on whether or not we should continue to promote the refuge as a demonstration area, principally for renewable energy and green business practices, best management farming and forestry practices, and habitat restoration for diversity.

For renewable energy, we need to consider whether to modify our demonstration projects on wind and solar power. The results of the wind power project have been mixed and not as successful as we had hoped. We are thinking that it should be moved to another location where it could be more effective. The solar project has more potential and we are looking at adapting this to the visitor facility where we can take advantage of it year round, versus in its current location at the former headquarters office where it is only used seasonally.

For best management farming practices, we need to consider whether to continue demonstrating all or some of our sustainable agriculture practices, including crop rotation, cover cropping, no-till farming, use of grassed water ways and field borders, use of sediment basins to collect cropland run-off, band spraying, and use of the most effective, least environmentally harmful pest management practices.

For best management forestry practices, we need to consider whether to showcase riparian forest protection and management, and demonstrate stand treatments that allow a healthy, native forest to establish and benefit of forest-dependent birds and other wildlife.

For other habitat restoration, we need to consider whether to continue showcasing the shoreline armoring and breakwater project and the positive changes that have resulted. There may also be opportunities to demonstrate refuge habitat management including freshwater impoundments, and invasive plant management. Finally, the refuge's BayScape project, which is part of a regional program that promotes native, regional vegetation attractive to wildlife, but requires minimal input of water and chemicals, could be promoted. It is a garden of native wildflowers and other plants, approximately ¼ acre in size, and is primarily maintained by volunteers. It is a popular site to visit by botanists and gardeners.

Issue Area 3. How can we address the effects of expanding human populations and increasing recreational demand in the Chesapeake Bay region on Service trust resources at the refuge?

The Bay region's rapid population growth has led to increasing demand for outdoor oriented recreation on the Eastern Shore. In 2007, the refuge provided more than 55,000 visitors the opportunity to learn about and view waterfowl, rare species, and other wildlife. This visitation has been accompanied by increasing occurrences of unintentional and sometimes deliberate disturbance of wildlife and damage to refuge resources and property.

We address this issue area through our objectives and strategies under goal 3.

How can we maintain or expand recreational, interpretive and educational opportunities on the refuge given our limited resources?
The refuge is now managed as part of the CM Refuge Complex and must share staff and funding resources with Blackwater and the other refuges in the Refuge Complex. The 2006 CCP for the CM Refuge Complex identifies staffing needs anticipated at that time. Our discussions in chapter 3, under goal 3 alternatives B and C, propose additional staffing for the refuge over the next 15 years. Proposed staffing by alternative are included as appendix E. We need to determine how best to employ these staff to meet our species and habitat management goals and provide continued levels of visitor services.

We heard recommendations for increased access, more trails, more parking, and better designed boat launch sites. Environmental education was the most requested program; expanding partnerships with educational institutions was recommended.

How can we best address unauthorized uses or damage to refuge property?
Control of illegal access by boaters
Boat launching facilities at Bogles Wharf and Ingleside allow legal access for motorized and non-motorized watercraft to the Chester River and Chesapeake Bay. However, access to the refuge along its 15 miles of shoreline must be restricted because boat landings can cause shoreline erosion, habitat damage, wildlife disturbance, including, disturbance to nesting bald eagles. Recent construction of a self-guided kayak trail around the island provides compatible use and signage that allows views of the refuge habitats and wildlife along the shoreline but that warns against encroachment and landings at unauthorized locations.

At issue is how best to conduct effective outreach and education about closed areas, and in turn, enforce those regulations.

Control of vandalism at the north end of the refuge
County Road 445, locally known as Eastern Neck Road, where it heads south onto the refuge at the Eastern Neck Narrows bridge and ends at Bogles Wharf, provides access to the northern 1/4 of the refuge from official sunrise to official sunset seven days a week. Continuing south, just beyond the Bogles Wharf turn-off, the road has a gate which is typically open between 7:30 am and ½ hour after official sunset. Without regular monitoring and enforcement, the ungated road on the northern portion of the refuge essentially provides unrestricted access to that section of the refuge and has led to incidents of damage to refuge property, including damage to the wildlife observation tower at Turkey Cove, damage of facilities at the Tundra Swan boardwalk, and of littering and campfires by picnickers away from authorized locations.

At issue is how best to conduct effective monitoring and law enforcement of these sites given our resource limits.

Issue Area 4. How can we best address potential effects on cultural and historic resources?

The refuge has a rich history of Native American habitation and, since the time of European settlement of the Bay region, as a center of fishing and shellfishing activities on the Bay, commerce on the Chester River, and farming and waterfowl hunting. The refuge has many identified cultural sites. Unfortunately, we do not have a complete inventory for the refuge. Primarily, we have been surveying specific project areas before we implement any action, so the current inventory areas are scattered across the refuge.

Among the substantive concerns we need to address with respect to cultural and historic resources are:

1) Effects of shoreline erosion on archeological sites
2) Looting of archeological sites
3) Maintenance of historic structures

Because Federal laws protect these cultural resources these issues are addressed through our objectives and strategies under Goal 1.

How can we protect archaeological sites that are uncovered then eroded away along the refuge shoreline?
Not only does shoreline erosion threaten the physical integrity of the island and its wildlife habitats, but it also threatens exposure and loss of archaeological sites. Shoreline erosion will be addressed under goal 1 in terms of shoreline stability. Participants in projects for shoreline protection may discover archeological sites in the course of their work, as will refuge staff in their regular duties and perhaps even visitors. Steps need to be taken to assure the proper procedures for recording and disposition of the archeological information.

How can we best identify and protect archeological resources on refuge lands?
Artifact collecting was a common activity prior to refuge establishment. However, this practice is not allowed on refuge lands, as it violates federal laws protecting historic and cultural sites. When an artifact is removed from its original location, both the object and its context are lost.

Since all of the sites and artifacts on the refuge are now protected by Federal and State law, visitors are instructed that if they discover any artifacts on the refuge, to leave the object in place and report its location to the refuge staff. Unfortunately, looting remains an occasional issue and we will continue to be vigilant about its enforcement to the best of our capabilities.

How do we maintain the historic buildings, proposed or listed on the National Register, in keeping with their historic character, but also making them functional to our needs?
The current refuge headquarters is eligible for National Historic Register listing and is being carefully rehabilitated to preserve its historic character. This rehabilitation is very expensive and funding its long-term maintenance is also a concern.